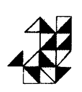
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The Role of Arabic–Islamic Civilization In European Renaissance As a Model For Inter-Civilizations' Dialogue

By

Abdul Moniem El Gameiy

Translated by

Ahmed Seif El Nasr

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Index

Dedication

To the land of the civilizations that inspired the European renaissance.

To the land of pioneers, whose genius thinking opened the way for European thinkers to follow.

To the land where the sun of science and arts rose.

To all those who contributed to the development of human civilizations, from east or west.

To those who enlightened minds, and who were open minded allowing a fruitful inter-civilizations' dialogue, giving and taking, putting aside bias and supremacy trends.

To Arab and Islamic nations and sons, those who graced history with their civilization,

I dedicate this book..

Author

Introduction

It was the heritage left by the ancient generations that paved the way for humanity to achieve the current level of civilization, a heritage without which no progress or development was ever possible.

This is why the human thinking must be considered as a body that grows and develops. Parts of this body perform certain roles at certain times, which in their turn were preparing for other certain roles to be performed later on.

Greeks, Persians, Indians and Chinese - as examples - provided the early ancient world with all their inventions and sciences, and then came the Arabs who prepared the minds for performing the roles, which the Europeans played subsequently. At that time, there were no competitions among civilizations, for they used to adopt what their predecessors achieved in the different fields and then added to it.

The first sources of Arab civilization were the peoples in the states they opened as those peoples had deep-rooted respectable civilizations. There was the Sassenach civilization, prevailing in Iraq and Persia, a civilization that was keeping a special Asian legacy from both the Chinese and Indian civilizations - that contributed in its creation to a great extent-. There was also the Byzantine civilization prevailing in the region of the Mediterranean Sea. This civilization was of oriental Greek origins because the Byzantines and the Romans were the scholars of the major Greco-Roman cultural centers in Greece, Alexandria, Hearn, Arraha, Nezibe, and Antioch.

Arabs had their own ancient noble heritage of civilizations. There were those of Maein, Sabaa (Sheba), and Hemier in Yemen. There was also al-Hejaz civilization - which was famous of its commercial and religious activities- . Yet, when they opened other countries, they found well developed and advanced civilizations, having organized governmental administrations and superior economic systems in agriculture, irrigation works and industry; added to this there were also the developments in the fields of mental and experimental sciences such as mathematics, astrology, and physics. Arabs did not lose the opportunity of benefiting of these systems and developments within the limitations of their traditions and beliefs.

Hence, we can consider that the Islamic State, in its dependence upon those civilizations, had managed to combine and mingle them in an Islamic blend. A blend that formed the basis of that amazing scientific renaissance extending over a period beginning from the emergence of the Abbasid state until the end of the Tenth century A.D

If the Arab Islamic State in the beginning of Islam claims the merit of spreading Islam, communicating with many ancient civilizations, and laying the first seeds of Islamic civilization, yet the Abbasid State can claim the favor of protecting the roots of this civilization and actively working to make it grow and flourish. The Muslims in this Abbasid period at first conveyed and translated that ancient heritage of other nations into their Arabic language; by the time they assimilated this heritage, they then began to produce, create and add to it, until they provided the world with what was known as the Arab/Islamic Civilization. Arab/Islamic Civilization was based upon the three features that characterize the major civilizations, which are distinction, originality and ability to contribute to the development of humanity.

Human culture has several Eastern and Western sources, similar to the current of a river that many tributaries supply with water, and it by its turn has many branches nourishing new ranges and reviving latent energies.

These facts can be clarified on studying ancient civilizations and cultures unveiling their true nature. No human civilization could flourish in a certain nation during a certain period without mating with a foreign civilization. Each of the human civilizations was benefiting from the efforts of preceding civilizations, a process without which the world civilization would have not made any progress. Instead of adding and building on ready basis, every nation would have to start from the very beginning.

Human cultures were transmitted from one through nation to another, by means of communications, invasion and conquests, or through translation.

After the Islamic conquests, the Eastern Christians communicated with the Muslims and enjoyed living with them in a lenient religious atmosphere; moreover, they participated in intellectual and cultural activities and were among the pioneers who led the new Islamic scientific movement. They excelled in many professions as physicians, philosophers,

astronomers and chemists who contributed in transforming the Greek heritage into Arabic.

Scientific research was liberal and free from barriers of race, language or religion. Muslims took from Christians and gave to them, Arabs took from Persians and gave to them, this proves that science is not limited to only one nation. Human civilizations are the outcome of varied and continous human efforts. This is clear in the history of ancient, middle, modern and contemporary civilizations and is confirmed by the relation between Islamic East and European West, which flourished largely in the Abbasid period.

In spite of the fact that such contact had primarily emerged in the late Umayyad period, yet, writing books began in the Abbasid period including books in all branches of science written by hundreds of authors. Reviewing the *Fehrest* (Index) book by *Ibn el-Nadiem* which indexed the texts written in that era will be amazing, not only regarding the huge number of books but also at the way Islamic scientists in that period handled all kinds of sciences. Those great people played an active role in laying out the foundation for a dialogue among the newly born Islamic/Arabic Civilization and the civilizations of India and Persia in the East and that of Greece in the West. Participants in that dialogue included some scientists, philosophers and literary men such as *al-Kendy*, al *-Farabi* and *Ibn Sina (Avicenna)* who led a dialogue with the world civilizations concentrating on the scientific and philosophical achievements and the extent of the mutual effects between civilizations.

We can say that without the Arabs conveying what was left from the Greek books to Europe; the European renaissance would have been delayed. Also, without *Ibn El Haytham*, *Jaber Ibn Hayyan (Geber)*, and other Muslim scientists, the emergence of *Galileo*, *Newton*, and other European scientists would have been delayed in the same way. In other words, without Ibn el-haytham Newton would have to begin not from where Ibn el haytham reached, but from the very beginning, and without Jaber Ibn Hayyan (Geber) Galileo would have to begin not from where Jaber Ibn Hayyan (Geber) reached, but again from the very beginning. Hence we can say that without Arab and Muslims efforts, the European renaissance would have begun in the 14^{th} century from the very same point the Arabs started their scientific renaissance in the 8^{th} century A.D .

Arabic-European relations became more active after the development and spread of the Arabic/Islamic state and the expansion of its activity with having Many Arabic cultural centers that emerged in Sicily, Cyprus, Crete, and parts of South Italy and France. There were also the Islamic Caliphate in Andalusia which competed with the eastern Islamic Abbasid Caliphate. These relations were in general of a civilized nature.

Towards the ends of the middle ages Europe rose up from the darks of these medieval ages to find a flourishing Arab-Islamic civilization, Europe then welcomed this civilization and began benefiting from it and adding to it many methods of scientific research and scientific facts. Then time had its turn over and suddenly the Arab/Islamic civilization began to retreat in front of the modern European civilization.

Thus, Arabs had no other choice than to derive from the Europeans, Arabic language - as the language of sciences- was replaced by European languages, Arabs had to learn these languages if they wanted to gain knowledge, especially after the loss of the original Arabic manuscripts leaving the Muslim/Arab heritage kept only with Europeans and written only in their languages.

The European renaissance was a turning point in all aspects of life not only in Europe but also allover the whole world.

After the series of geographic discoveries that resulted from European imperialistic movement, the industrial revolution, and the growing nationalist movements in Europe, European imperialism extended to the East, followed by exploitation of its resources. Subsequently, national awareness appeared and Arab peoples launched revolutions against imperialism, followed by liberation movements especially after *The Second World War,* which made great changes in the features of the world map. Some states took a leading position such as *The Soviet Union,* which emerged as a force competing with the Western block led by *The United States*. Some others retreated from first to second rate such as Britain and France. There appeared also the so-called *Cold War* between both the Eastern and Western blocs, which continued until the disruption of Berlin Wall in 1989, and the fall of *The Soviet Union* in 1990. After the end of the Cold War the world of two poles disappeared and the *U.S* emerged as the one and only pole in the world. Throughout that period, new conflicts

erupted in many regions of the world substituting the old ideological dispute between *Socialism* and *Capitalism*. Some of these new conflicts were religious, ethnic, or tribal; others were resulting from latent historical causes related to competitions for authority, benefits, or influence.

Some Western mass media began announcing the beginning of a new world distinguished with co-operative relations instead of disputes and conflicts. At the same time, new terms emerged such as the conflict of civilizations, cultures and religions. In addition, the idea of searching for a new enemy emerged especially after the appearance of some attempts for explaining and foretelling the future movement of history. The most significant and effective one was the *Fucuyama* theory known as *the end of history*, then the ideas offered by *Samuel Huntington*, prof. of political sciences in *Harvard University* in USA , about " *changes in the sphere of security and U.S national interests* ", under the title of The Clash Of Civilizations . He said that the Islamic threat to the Western civilization is a true fact and the conflict between the West and Islam will be inevitable and also the war between them will take the place of war between the West and Communism. Since that time, writings continued on that subject either approving this opinion, expecting a cold or hot war between Islam and the West, or opposing it and trying to bring Muslims, Europeans and Americans closer and declaring that Islam is free from fanaticism.

Several Arab and Islamic writers criticized the ideas against Islam and substituted the word conflict by the term dialogue. There also appeared the idea of protecting humanity from the dangers of religious conflicts whereas U.S and European mass media began to repeat the sayings of *Huntington* and approve them, claiming that Islam as a belief calls for fanaticism and radicalism. Consequently, conflicts increased in many parts of the world, creating a common state of human anxiety and sufferings of millions that was aggravated after events of *Sept.11th.2001* when some civil planes penetrated the highest world towers – the symbol of American hegemony. A deep sense of anger and hatred towards Arabs and Muslims prevailed U.S and some European states due to the haphazard quick accusations by Western responsible authorities of Arabic and Islamic groups with arranging the events and stigmatizing them with terrorism. There emerged the notion of the civilizations clash to face any opponents to the

capitalist Western model. On the other hand, there spread a wave of refusal and protest against U.S. policy for its treatment of the events and its complete alignment with Israel against the Palestinian rights.

In this study, we are trying to review the facts of this subject objectively, intending to clarify all matters to all people everywhere around the world especially the Western people who are disgracing Islam and stigmatizing Muslims with terrorism and being blood thirst. We are also emphasizing the fact that there are no conflicting civilizations, but civilizations are in a dialogue the model of which was offered by the Islamic civilization. In this model, Islamic civilization was giving to other civilizations and taking from them. Islamic civilization did not underestimate the cultures of nations opened by Muslims, on the contrary, it assisted their people and was assisted by them, which means that Muslims sometimes played the role of teachers who taught, corrected and added to their sciences. In other times, they played the role of the student who benefited from the sciences of Greeks, Persians, Indians and others. Communication between nations has certainly its active effects on customs, beliefs, language and culture. These effects are more evident among the weak than they are among the strong, since people were, and are still fond of imitating those who are superior to them in the aspects of civilization and culture.

Islam appeared as a system of life that defines the way and points out clearly the features of life on earth and after death; it realized justice, equality, freedom and respected human dignity. Islam has acknowledged man as a body, mind and soul and managed to establish a human unity based on liberty, equality and tolerance, it also strived to remove political barriers between different countries giving them a unified form, an attitude that had a direct effect on several aspects of life.

It must be mentioned that in Europe there are some unbiased scientists, these scientists represented the true spirit of scientific research and gave attention to Arabic heritage, and recognized the greatness of what the Arabic mind left to science and culture. They became certain that the Arab civilization is a glorious one, deserving all respect and pride. For instance, the *Faculty of Medicine* in *Paris University* highly estimated Arab scientists' efforts to the extent that it still keeps two large portraits in one of

its major halls, one for *al-Razy (Rhazes)* and the other for *Ibn Sina (Avicenna).* In addition, *The American Princeton University* recognized Arabs' services and favors for humanity and culture; this was expressed by allocating the best part of one of its most magnificent buildings for the works of *al-Razy (Rhazes)* who is one of the most famous and prominent leaders of Arab civilization. This university also established a house for teaching Arabic sciences and searching for Arabic scripts to translate them into English, so that the world can become aware of the influence of the Arabic heritage on scientific progress and human prosperity.

The effects of Arab Islamic civilization on the Western civilization and culture are subjects with several branches and multiple approaches, in which a number of scientists showed great interest. Examples of these effects was what was evident in *Dante*'s *The Divine Comedy*.

Andalusian and classical Arabic poetry had a great influence on the European lyrics. *Ibn Sina (Avicenna) had a great impact on* European philosophy. The growing interest in studying Islamic heritage and its impact on European thinking is a proof for the continuity of world civilizations, and is emphasizing the importance of human dialogue as a means to reach human unity and settle peace among all countries regardless of color, ethnicity, culture or language.

The booming civilization that Europe claims nowadays is the sum of successive efforts of major civilizations, which left distinguished marks on human history, including Arabic/Islamic civilization. This means that the current modern civilization is a compilation of many civilizations - not restricted to any specific country or people - but established by the efforts of humanity at large.

To clarify these facts, the plan of this study is restricted to three main sections :

Section (1) deals with the passages of Arabic/Islamic civilization to Europe in the beginning of the renaissance age.

Sections (2&3) deal with the evidences confirming the influence on the European thinking by the achievements of Islamic thinking in literature, geography, history, music, architecture, navigation, medicine, astronomy, engineering, philosophy, arts and others . Certainly, other fields can be added to these subjects such as sociology and political thinking.

Section (4) demonstrates how the meeting of civilizations is an inevitable necessity for making a dialogue. The idea that Western civilization is more superior to Arabic/Islamic civilization is refused by history and fact, and that the chance is still there to change these ideas and establish a world where stability, peace, and mutual respect among nations and peoples are dominant. Finally, we cannot help wondering that man, the maker of civilization, sometimes has a contradictory attitude to what he himself has established, and exposing this civilization to dangers and threats of annihilation and even destruction which will not only ruin civilization , but even man himself in case he does not act rationally.

Chapter I

Passage Ways of Arabic/Islamic Civilization to Europe

In ancient and medieval ages, the world was limited within the three old continents: Europe, Asia and Africa. Arab countries were at the intersection of these three continents. After the appearance of Islam, Arabs carried the responsibility of establishing a great Islamic state extending from the Atlantic Ocean (the so-called "*river of darks*") in the West to the borders of China, India and the Gulf region in the East. In other words, the Arab Islamic state included - in the Near East region- vast parts of North Africa and West Europe. It also extended eastwards to include vast parts in South, West, and Middle Asia. In addition, there were some countries and regions to which Arab power spread under Islam umbrella in West, East and Middle Africa. These regions included a unique geographic location in that middle of the ancient world, where the world transport roads between East and West met, carrying the products of human thinking in different aspects; intellectual, literary, cultural, commercial, and others.

In the middle Ages, effects of Arabic/Islamic culture reached Europe first by means of commerce where goods were transported from Asia to Eastern and Northern Europe. Then, Islamic civilization took its way to West Europe through several pathways, most significant of which were three: *Andalusia and southern Sicily, El Sham Countries,* and *The crusade Wars.*

These pathways assisted Europe to resurrect its culture once again and develop magnificent advances in sciences, literature and arts. *Alexandre Koyne*, a famous Western scientist, affirmed that: *"Arabs were the professors and intellectual tutors of Latin west, they were not only a mediator between the west and the Greek East as it was said. Without Ibn Sina (Avicenna) and Ibn Rushd (Avirroes) the existence of St. Thomas would have been impossible. Without the Arabs in Cordoba - who remained there till the 16th century - as source for the European the only script of the book of Euclid would have been unknown".* Roger Bacon also believed that all literary and scientific cultures in Medieval Christian centuries were stamped with Islamic seal and mark; confirming by that the same opinion of *Alexander Koyne*.

For clarifying this picture, we shall deal with the pathways via which the Arabic/Islamic civilization reached Europe.

Andalusia

Arabs opened Andalusia in 711 A.D. , by that it was the first country they opened in Christian Europe and added to the Islamic state. Since that date until 1492 A.D., the Arabs ruled this region and left the stamp of their civilization on it. They mingled with the people of Iberian Peninsula, lived with them, their bloods were mixed through marriages between Christians and Muslims who managed to spread their religion, language and civilization.

Consequently, a vast process of social mingling between different elements of Arabs and the original people of the countries leading to the existence of a new generation named "*the Mowlladein* (hybrids)". Also, a number of Spanish people joined the Islamic religion and were known as "*El Mosalama*". Moreover. There was also the sector known as "*Mostarabein*" who, despite preserving their Christian religion, were mixing with the Arabs and influenced by them in their language, conduct, customs, dress, and different means of their life. There were also the few Jews who were living in Spain before the Arabic conquest and who much contributed in transmitting a number of Arab cultural elements to the country.

These different elements (Mowaladdin, Musalama, Mustarabin, and Jews) co-existed with each other and were also influenced by each other. Moreover, those who were evidently influenced by the Arabic language, not only translated the religious books but they were also considered a means for spreading Arabic/Islamic culture in North Christian Spain, for they were willing to immigrate to the Christian region, particularly the two kingdoms of *Castile* and *Aragon*. Consequently, Spain was a main meeting point between the coming Islamic civilization and the Greek one. It was also the center transmitting to Europe -directly and indirectly- the Arabic sciences, literature and philosophy, both the original ones and those mixed in some of its components with preceding human civilizations. So it conveyed to West Europe part of that Arabic heritage that was keenly kept in its land both original, or Arabized.

Islamic civilization reached its climax in Andalusia in the second half of the 10^{th} century A.D. when *Cordoba*, the capital of *Umayyad* Caliphs, became the greatest cultural city in all Europe, with its treasury of Caliphs palace containing more than 400,000 books.

Eminent Europeans came to Andalusia to benefit from its sciences. Arab/Islamic civilization, continued to play as a minaret illuminating actively Andalusia especially in cultural, economic, and artistic fields This light extended to illuminate also Western Europe in the 12th and 13th centuries. The Spanish people were eager to use the Arabic language, even preferring it to Latin. Andalusia, thus, became the principal center for the movement of translation from Arabic into Latin. It attracted many of European renaissance pioneers in the 12th century to learn Arabic sciences. The flourishing culture and education in Andalusia, during the era of Umayyad rule - which lasted for more than 280 years -was considered the most glamorous age of Arabic civilization in Spain. Industry also achieved a great progress, Besides the appearance of a distinguished system for irrigation, some agricultural products came from the East such as rice and sugar cane, palm trees , apricots and pomegranate. Andalusia was also famous of cultivating different kinds of vegetables and fruits, so that much of their names entered Spanish language such as:" *Berenyenas, Alcarchofa and Azafran*, ...etc" . A highly profitable commerce took place between Cordoba and several Muslim countries. There were also a boom in education and art; the famous fineness of Arabic poetry was transmitted to Andalusia that in turn became renowned by creating magnificent Arabic poetry related to music and singing. Astronomy and history boomed as well.

Andalusia was, accordingly, the mother of a large number of scientists, Fakihs (Islamic scholars), literary men, poets, historians and physicians. As an example, Islamic scholar *Abou Mohamed ibn Hazm al – Kortobi (of Cordoba)* (456H- 1063 A.D.) whose writings -that were more advanced than the era he wrote in-, depicted his self respect and his high esteem for his homeland, an example of his books there is the famous book entitled *The Pigeon neckband* , or *TOK EL HAMAMA* , in which he dealt with love, its meanings, reasons, and symptoms. Europeans were interested in that book and considered it the first psycho/analytical study of the passions of love and lovers and they translated it into several languages.

With regard to his book *Judgement of Beliefs , Inclinations and Religions* this was a critical , comparative study of religions, doctrines and different religious groups. It can be noted that this kind of religious comparative study reached Europe only in the last century, which is a proof for the value of the book and it contribution to world civilization

Abi Marwan Ibn Hayyan El Kurtobi (469 H -1076 A.D.) was one of Ibn Hazm's friends and contemporaries. He was considered the greatest historian in Islamic and Christian Spain in the Middle Ages. His two books The Aquired and The Firm proved that he was highly qualified and had a great knowledge on Andalusia and Spanish Christian kingdoms history beside some aspects of French history.

Actually, modern researchers consider the writings of Ibn Hayyan, as a scientific treasure for this Spanish Arabic heritage in its different forms. Among the sons of Cordoba is also the well-known surgeon *Abu al-Qasim al-Zahrawi (Albucasis)* (403 Hijry – 1013 A.D.) who was affiliated to *Meniat El Zahraa* a suburb to the west of Cordoba in the districts of west Cordoba. He was known in Europe by the name of *Abulcasis*. His book *Solution For Anyone Who Could Not Compose,* is considered a medical encyclopedia provided with illustrations of surgical instruments. By this work, *al-Zahrawi* was the first one who made surgery an independent science, based on knowledge of anatomy. This book was translated into Latin and Hebrew. It was also published in *Heider Abad* in India. The family of *Bani Zahr* in *Sevilla* had a great fame, related to important writings in Medicine, so that the name *Ibn Zahr* became well-known in all scientific circles in Europe with the name of *Avenzoar.*

In the field of philosophy, we can remember *Abu el-Walid Mohammed Ibn Rushd of Cordoba* (Averroes 595 H – 1198 AD) who was famous by his explanations of *Aristotle* books. His philosophy has been taught in European universities like *Paris* in France and *Pad ova* in *Italy*. Due to his deep analysis, profound illustrations and honest translation, the Europeans named him the great teacher or *Aver roes*. The Italian poet *Dante* put him in his epic *The Divine Comedy* in the region of Limbo between paradise and hell accompanied by *Ibn Sina (Avicenna)* and *Saladin* due to their greatness. *Michael Scott* introduced his philosophy to Europe through the translation of his works into Latin in *Toledo* school in 1230 A.D.

Andalusian people's fondness of possessing books and establishing libraries created an excellent cultural environment in Andalusia at that time. Paper mills in Toledo provided book industry with due stationary; book copiers were summoned from everywhere, whereas bookbinding became a

booming industry. In addition, the Europeans came to Cordoba to enjoy visiting the royal palaces with their magnificent gardens named *Menyat*, most famous of which was *Meniat El Rasafa* built by Abdurrahman *al-Dakhel.* They also frequented Seville; the country of beauty and glorious gardens linked together by a net of water channels that still keep their Arabic names in the Spanish language such as *Acequia*, meaning *the small stream* as well as the *Noria* and *Vega*. Europe groups frequented Seville seeking luxury tools, cosmetics, hearing music and singing, besides other entertainments.

Toledo was the major road to transmit treasures of knowledge from the East to Europe. While the Arabs knew some ancient sciences of the West from Greece, the West similarly knew Eastern sciences from the Arabs in the middle Ages. Such was the case of Arabic/Islamic civilization in Andalusia until the 11th century.

We must mention here that political or military aspects did not control the exchange of civilizations and cultures between both the Western and Eastern civilizations in Andalusia. Hence, their relations were continuing despite the conflicts that were existing between the Spanish and Muslims. The Islamic Andalusia, even in its ages of weakness and collapse, had a great influence on Christian Spain. The turn of force balance to the benefit of the Christian kingdoms in Spain and Portugal did not stop their benefiting from the culture of Muslims, and even transmitting this culture to different European countries. After the fall of Toledo in 1085 by *Alfonso the Sixth*, king of *Castile*, that city remained keeping its Arabic spirit. Hence, students came in increasing numbers from different countries of West Europe to Spain for gaining more provisions of Islamic studies, a situation that highly activated the movement of scientific exchange and the translation of several Arabic writings into Latin. A number of Greek writings of people, like *Galen*, *Hippocrates*, *Plato, Aristotle*, *Euclid* and others, were also translated from ***Arabic***.

Toledo remained a cultural center where Muslims, Christians and Jews scientists were gathered in the courts of its Christian kings who initiated a scientific resurrection. This renaissance began in the age of *Alfonso the Sixth* and continued through the age of *Alfonso the Seventh*, who protected those scientists and encouraged them to continue their efforts.

They translated many Arabic books into the language of Castile at first, and then into Latin. When *Alfonso the Tenth*, known as the scientist became the king of Spain, that scientific movement witnessed a great progress. In his reign, the language of Castile (Spanish) was used instead of Latin. To achieve this end, He sought the assistance of a large number of Muslims, Arabs, Arabists, and Jews scientists, he drafted work plans for them to execute , and supervised their work. A methodology that enabled this school to blend all these Arabic and Latin works into a Castile mould that produced many immortal historical and literary creations.

In that way, Translation movement was active in several Adalusian regions, among them were *Barcelona* and *Tarazona*, beside Toledo which was the most prominent in this movement. In the first half of the 12th century, *Raymond*, archbishop of Toledo established a major center for translation from Arabic sources into Latin. Throughout that period, *Robert Chester* translated the *Quran* for the first time into Latin. In addition, *al - Khawarizmy* had his translations in mathematics besides some Arabic writings in astronomy and chemistry. *Gerard*-as well- translated more than 70 books dealing with the different branches of knowledge mainly mathematics, physics, chemistry and medicine. Moreover, in the beginning of the 13th century, the English *Alfred*, the Scottish *Michael Scott* and the German *Herman* all worked in translating the Arabic references in Spain. Hence, Andalusia was the first bridge carrying the Arabic/Islamic civilization to Europe.

Sicily and South Italy

Sicily's geographic location between South Italian coast and the Tunisian coast made it a link of civilizations and politics between Africa and Europe and also a main crossing point for transmitting Islamic intellectual heritage and civilization to Europe – a role that lasted even after the end of Muslim's reign which exceeded two and a half centuries 827 – 1092). During that period, Cecily enjoyed a flourishing Islamic rule especially when Aghalebas and Fatimides were the rulers; Islamic civilization was spreading to different cities. There was an increasing number of mosques, palaces, hospitals, markets, public baths, and citadels; besides the new industries introduced by Muslims such as paper, silk, ships,

and mosaic works of colored marble. They also extracted different raw materials such as sulfur, petroleum, ammonia, lead, and iron. Moreover, they participated in the works of agriculture and commerce, spreading their customs, cultures and language among people. Such a relation between Arabs and Sicily lasted during the *Normandy reign* (1091 – 1194) and then in the period of its affiliation to the German empire. The impact of Islamic civilization reached its peak in the age of emperor *Fredrik The Third* (1208–1250) and lasted till the final departure of Muslims from Sicily and then from South Italy in the end of the 13th century A.D where they ultimately gathered in North Africa.

The intellectual movement in Sicily during that period acquired its Arabic culture and intellectual heritage from scientists of Morocco and Andalusia. That civilization flourished much wherein the Western Christians lived with Muslims together. It is known that Arabic conquest of Sicily, which was including soldiers, scientists and religious men, was launched from *Tunisia* led by the Faqih (religious authority) *Asad Ibn el - Furat*. Many of *al-Qeirawan* religious men landed in Sicily after its opening to perform their religious and scientific duties in the island. Besides the Moroccan scientists' moving to Sicily, some Sicilian natives moved to Morocco seeking education by Muslim scientists, which is an evidence that *Qeirawan* played an active role in directing the thinking and culture in Sicily.

In addition, Andalusia was representing a significant cultural tributary for Sicily. It contributed to flourishing Arabic culture and sciences in this island. As a result, a number of Sicilian scientists appeared and excelled in different kinds of knowledge they led the cultural movement inside their country, then by their turn managed to spread it outside their home island where the west made use of Islamic culture/civilization. It is to be noted that Islamic civilization never ended with the expiry of Muslim reign of the island; as the subsequent Norman reign was encouraging it to a great extent. Arabic culture continued to exist in the royal court, King *Roger The First* (1092–1101) was extremely interested in everything concerning the Arabs; he protected them, kept their judges in their posts, and appointed many of Arabs in governmental jobs. He also formed a brigade of Arabs in his army. Generally speaking, he patronized Arabic culture; was issuing his

decrees in Arabic beside Latin, he also imprinted Arabic writings on one face of the coins, and Latin/Greek on the other. Therefore, Sicily in that period became a half Islamic kingdom in its religious, administrative and military systems. *Roger*'s successors also adopted his methods, so that the royal court of *Roger the Second* (1101–1154A.D.) combined Arabic, Greek and Latin cultures. King *Roger* himself was speaking and reading Arabic language, wearing oriental clothes and having a royal court similar to Islamic palaces. An example of his tolerance and love of justice and equality was that he was minting his money in Arabic, Latin and Greek. His royal court in Palermo was full of Muslim poets and scientists and he used to take the advice of his Arabic counselors in most of his affairs. He called to his court the great geographical scientist *Mohamed al-Idrisi* (1164–1165) and asked him to draw a map for the world. al-Idrisi fulfilled the kings request and drew that map on a silver circular plate (planisphere) of three meters length and one and a half meter width.

He also constructed a disk-shaped map of the known world (i.e., the world's Eastern Hemisphere), both of which were made of solid silver. The silver map, which was one of seventy accurate maps he produced, was based on his encyclopedic work, (Pleasure for that who longs to penetrate horizons) The book was also called the Rogerian, or the Book of Roger, and was translated into Latin in Paris in1619.

Scientists and orientalists were much interested in that great important book and managed to publish its parts and translate them into different languages, one important example for these translations is the Italian one made by Italian orientalists in seven volumes. Hence, we can see that King *Roger the Second* was, as the Italian scientist *Michael Amery* descried him, an Arabic sultan carrying a crown like western kings. His religious tolerance led to mix Arabic, Greek and Latin cultures together and made Sicily one of the basic passageways that helped transmitting Islamic civilization to Europe. All that had a great effect in the appearance of the movement known as the Renaissance towards the end of the middle Ages.

Roger The Second was succeeded by his son *William The First* (1154– 1166 A.D.) who adopted the policy of his father and his grandfather in protecting Muslims and encouraging Arabic/Islamic studies. His sign was like that of his father's: *"We thank God for all graces"*.

He was succeeded by his son *William the Second* (1166–1189 A.D.) who was imitating Muslim Kings. He became perfect in Arabic language, reading and writing. He chose his ministers, guards and concubines from his Muslim subjects, giving them their religious freedom and his sign was "*We thank God in the right way*" .

After his death, *Sicily* was ruled by *Frederick The Second* (1194 – 1250 A.D). Being the son of *Henry the Sixth*, the German emperor, he became the emperor of Germany and the two Sicilian kingdoms that included the island of *Sicily*, and *Naples* region. Thus, the rule of Sicily was passed from the Normans to the Huhenchtawfin German family.

Like his predecessors, Emperor *Frederic* exerted much effort in studying and benefiting from the Arabic, Latin and Greek cultures prevailing in his era – an attitude that certainly affected his personality. That was evident in his interest in Arabic culture and translating its best scientific materials, his preference of peace in solving his political problems and making good relations with Egypt and El Sham Ayouby kings.

Frederick the Second, was fond of physics, mathematics and philosophy. He usually encountered scientific problems that he did not find among his surrounding scientists anyone able to solve; so he used to send them to his friends of Muslim kings to refer them to scientists in their countries to solve them. For example, he sent problems in astronomy and math to *King el-Kamel* which was solved by the Egyptian mathematician *Alamuddin Kaiser al-Asfouny*, the solution was sent accompanied by a book of astronomy as a present. In addition, King *Frederick* sent a group of philosophical questions concerning the universe, the soul, and religion to the Andalusiain Sufi philosopher *Ibn Sabein* to answer them. They were known as the Sicilian Questions. On being the king of Egypt, *Najmuddin Ayoub* followed the policy of love and friendship of his father *el-Kamel* towards Sicily. He exchanged with Emperor *Frederick the Second* grants and visits, of which we remember the Egyptian convoy headed by Sheikh *Serajuddin al-Armawy* who lived for some time in Sicily and wrote a book in logic for Emperor *Frederick.*

Emperor *Frederick* was succeeded by his son *Manfred* who was like his father in his interest in Arabic culture, mainly Math and Physics. He was contemporary of the first Memeluke empire in Egypt and el-Sham in the age

of Sultan *Beibars*. They became intimate friends, as it was the case in the Ayouby era. In that respect, the historian *Jamaluddin Ibn Wasil* says that Sultan *Beibars* had chosen him as the head of a convoy traveling to Emperor *Manfred* in 659 H (1261 A.D) and sent with him a present of giraffes and a group of *Ein Galut Tartars* war prisoners, with their horses and cavalry equipment. The emperor admired the present and treated them generously. *Ibn Wassil* described his meeting with the emperor saying that he stayed with him in a city named *Barletta* in South Italy. He found that he was so distinguished and fond of mental sciences, and he memorized ten articles of *Euclide*'s book in engineering. Near that place where he was staying, there was a city named *Lucena* whose natives were Sicilian Muslims, They performed The Friday prayer, as was the case since his father's era. He had begun to build a school there for teaching all theoretical sciences. Most of his friends undertaking his personal affairs were Muslims and, in his camp, all Muslim prayers were performed on time. Accordingly, the Arabs left in Sicily a great heritage of Arabic civilization and a huge number of books in different kinds of sciences and literature.

Therefore, *Sicily* was considered as the second crossing pathway through which Arabic/Islamic/civilization was conveyed to Europe. *Sicily* had a direct contribution in the translation movement. In *Salerno*, there was an active movement for translating Arabic and Greek sciences into Latin. Much Arabic books were translated particularly in the 12th and 13th centuries. In (1150 A.D), *Eugenius* of Palermo translated the book of *Alexandrian Ptolemy* on Arab views, and in 1162 Other books on astronomy and math were translated from Arabic into Latin. *Costantine* the African had a vital role in the translation movement. His most important works included the translation of a book of *Ali Ben Abbas El Magousy* known as the *royal book*, which was called in Latin *Liber Regius*. Translation of that book was a breakthrough in Latin medicine, especially with it having the first clear explanation of medicine in general.

Hence, Europe made use of the scientific movement in Sicily which had an undeniable impact on European renaissance.

Al-Sham Countries and the Crusades

Al-Sham countries represented the third intersection region between East and West in The Middle Ages during Crusade wars time. Although these wars which began in 1097 A.D and ended in 1291 A.D by the Memulk sultan *al-Ashraf Khalil Qalawoun* were fought under the pretext of religion, yet they were motivated by factors more strong than the religious pretense, factors of political, social and economic natures. Circumstances of that wars established increasing relations in civilization and commerce between Islamic East and European West. Some of crusade campaigns' warriors managed through those relations to transmit some knowledge on agriculture, navigation and industry, from East of the Mediterranean to Europe. This means that those wars were also a bridge over which the Islamic civilization was transmitted to Europe. Both Arabs and Europeans took mutual benefits from the civilizations of each other.

If we follow up some civilization indicators that influenced the *Franks* during the Crusades, we shall find them numerous and varied:

From the **social aspect**: due to the few number of Frank females accompanying fighters, the crusaders tended to marry native Christian women, Armenians, Maronites, and some Muslim female war prisoners. That resulted in a generation of born children known as *Pulani* who were much influenced by the oriental spirit. In addition, crusaders began to adapt to their new life in the East. In that sense, they wore the oriental loose garments, let long beards, ate oriental foods, lived in palaces and houses having the oriental features, of having wide rooms, halls and oriels with different ornaments. They also used in their feasts, parties dancers, and clowns, exactly like Muslims.

From the **economic aspect**: Crusaders benefited from the Islamic East to the extent that some historians considered their campaign on the East an economic war. In the field of agriculture, they transmitted to Europe plants and new trees to which they gave Arabic names such as sugar, rice, lemon, cotton, sesame...etc.

In **industry** : they were acquainted to many Islamic industries, they transferred them to their countries such as silk embroidered textures famous in El Sham, known as *Brocart*, cotton clothes made in Damascus known as *Damask*, *Musilin* from Mussel, clothes and *Tapis* textures in Baghdad,

beside industries of paper, soap, porcelain, glass, paints, jewels and drugs...etc.

Regarding **commerce**: it was revived between East and West to an unprecedented extent. Muslims' caravans came to crusade ports on el-Sham coasts, carrying the Eastern commodities such as pearls, precious stones, ivory, perfumes and spices. Muslim traders, on entering those ports, had to pay taxes on their goods. They were generously treated and could easily find some hotels for rest. It must be said that the movement of commerce between both sides continued, even during the wars. The explorer *Ibn Gubier* – who was contemporary to the wars-mentioned the saying that " *there were continuous different caravans from Egypt to Damascus to Frank countries; whereas the war lords were busying themselves in their wars , the subjects and traders were always feeling safe in all conditions be it peace or war.* "

The increasing commercial activity between the East and the West led to the appearance of commercial cities in Europe, which attracted farmers to settle in them instead of settling in the farms, the result was the collapse of the feudal system. Banks and banking system appeared in such commercial cities. These banks had much assisted members of the ruling class, by granting them financial loans, and were their allies against feudal men. These financial dealings led to issue what was known as the cheque and bills of exchange, meaning money order. Hence, the period between the 13^{th} and 15^{th} centuries, witnessed great progress and prosperity in commercial relations between Arabs and Europe in a new unprecedented way.

From the **military architectural aspect**, we note that Islamic architecture added new systems that were unknown before to the world artistic heritage. Examples for that are the shapes of roofs, designs of mosques, schools, palaces, bathhouses and the shrines. Moreover, Muslims invented the entrances of multi-facilities or multiple bends to allow better control of an invading enemy on entering these cryptic entrances in Islamic cities and fortresses. An example of them was Baghdad city whose doors of the outer fences were not in the same line with that of the inner fences, but they were separated from them for defense purposes, so Baghdad was named *El Zawraa'* (having a long narrow neck).

This architectural military technique was applied in a better way in the mountain citadel (*El Mokkatam*) in Cairo by the age of *Saladdin al - Ayoubi* in the sixth century and in *Aleppo* citadel in the seventh century H., and also in the Murrabetein and Mowahedin citadels in Morocco. This technique affected fortresses and citadels established by crusaders in al-Sham or Europe later on. An example of that was the citadel of *Crac De Chevlliero* North East of Tripoli that was rebuilt by the Esbitarian knights in a great system whose remains still exist until now. Moreover, Muslims invented the system called (soquata) which is formed of stone or wood boxes protruding from the wall and having holes from below, from these holes the defenders of the castle can pour grenades or hot liquids on the invaders; this system was transmitted to the West with the name of *Machicoli*. The crusaders applied that system in North Sham and in Europe. An example of that was *Gabar* citadel which was established by *Richard Lion Heart*, King of England, on the Sien river upon his return from the holy lands. Europeans also imitated Arabs in their use of courier pigeons for sending military letters to the fighting forces.

Regarding the **cultural effect**, it began since each party began to get knowledge about its opponent and tried to write about his present and past histories. The crusade war period produced a group of Eastern and Western historians; each representing the views of his party about those wars. The result was a rich, fertile material to study a living example of the interaction of civilizations.

Modern European historians gathered that abundant material about the crusades in a scientific encyclopedia named The Group Of Crusades Historians , ***Recueil Des Historiens Des Croisades*** **(Paris 1841 – 1906).** It includes writings of oriental historians in five volumes under the title ***Historiens Orientaux*** as well as the writings of Western historians in five volumes under the title of ***Historiens Occidentaux***. Among Muslim writers who wrote about the relations between Muslims and crusaders, we remember the Andalusiain traveler *Mohamed Ibn Gubeir* who visited al-Sham in the latest sixth century H (12 A.D) and described the mutual intimacy between Muslims and Christians in the crusade emirates.

There was also the historian *Osama Ibn el -Monkez* (583 – 1188 A.D), who was a knight as well. He was contemporary of *Ibn Gubier*, and

provided us with significant information on relations between Muslims and crusaders. His <u>*Consideration Book*</u> recorded his problems, friendships and comic situations with the crusaders. He also made a comparison between Muslims' and Franks' customs using his own experiences, and what he himself witnessed. His contemporaries praised *Monkez*, mainly *Saladin El Ayoubi* who admired his courage and his poems.

From Hammah (Syria) there was the historian *Gamalu-ddin Ibn Wasel* (691 H – 1297 A.D.) who included in his book about the Ayoubis some important information on *Louis The Ninth* King of France during his expedition in Egypt, and on emperor *Manfred son of Frederick The Second* when he met him as an ambassador for Sultan *el -Zahir Beibers*.

Another historian from Hammah was named *Mohmed Ibn Ali Nazif* who gave us in his book , <u>*The Mansoury History*</u>, , copies of some letters sent from *Frederick The Second* to a prince, narrating some news of his state and events that occurred after his return from his expedition in *Palestine* (626 H – 12229 A.D).

European historians who described their wars in the East and wrote also on Muslims and their countries were also numerous, among them was *William Of Tyre* (1130 – 1184) who was related to King *Amoury The First* and became a tutor of his sons. He progressed gradually in different posts until he became the Archbishop of *Tyre*. Among his basic writings was a book on the history of the crusade wars since it began in 1096 A.D untill the last days in 1184 A.D under the title *Historia reun in partibus transmatinis gestarum*. The book includes useful information about Egypt and its local affairs in the latest Fatimide era and on its commerce in the Red Sea with India. We must lastly refer to the French historian *De Joinville* who accompanied *King Louis the Ninth* in his expedition to Egypt and was imprisoned with him there. He wrote a book about this king named <u>*Saint Louis*</u> wherein he reported significant information on Egypt and Memlukes.

Hence, we can see that although the crusade wars were bloody, yet they helped in exchanging civilizations between East and West. The crusaders could no longer think that Muslims were cowards or cruel people, but they began to admire their great and glorious civilization, their courage in battles, faithful prayers, tolerance in treating other religions, and they realized all that with great appreciation. The English historian *Hearnshaw*

actually expressed that admiration saying: "*the crusaders left their homes for fighting Muslims, but when they saw how the Muslim civilization excelled by far their civilization in every aspect they found themselves under their feet, acquiring from them different kinds of science and knowledge*".

On the other side of Islamic world, the cultural and commercial relations between Muslims and Europe reflected themselves in the continuing mutual exchange between both Islamic and western civilizations. Constantinople was the meeting point and the bridge for that continuation of relations and interaction. When Muslims were continuing to impose pressure on Constantinople, as the key of the way to Eastern Europe, some Byzantine scientists left the city, carrying with them their classical books and cultural outputs, resulting from their cultural liaisons with Islamic world, particularly with Andalusia and al-Sham. They spread in Europe, mainly the Mediterranean region, and contributed in speeding up the European renaissance.

In that way, the crusade wars initiated western regular attempts to adopt Arabic civilization with its rich material and mental aspects. Having nothing to add to the Arabic heritage until the 16th century, the Europeans took from the Arabs more than they gave. They adopted much of their sciences, philosophies, architecture, military arts, industry, commerce and social life. Their language, literature, and societies were greatly influenced by Arabic language, literature and life. In addition, Arabs possessed commercial goods much needed by Europeans such as spices, drugs, and other well-known Eastern products.

Arabs were interested in continuing their commercial relations with Europe because of the high profits they gained. They had no difficulty in dealing with Europeans because their victory in the late crusade wars gave them full confidence in their power and superiority. While they could expel the crusaders from the East, Memluke sultans took over Cyprus. The Ottoman Turks became a powerful Islamic force as well. Arabs and Muslims were having a great trust not only in their ability to face Europe, but also in their superior civilization, particularly after witnessing the life style of the western people at that time in the middle Ages. The Europeans were inferior to the Arabs in their share of scientific, economic, and political culture. That situation lasted for years until Europe became superior in civilization and force.

In spite of the fact that crusade wars left political, military and social effects, and they were a liaison point between both Islamic and western civilizations, they had no great effect like Andalusia and Sicily, mainly in both cultural and practical aspects. This is because most Europeans participating in crusade expeditions had not enough culture and civilization that could enable them to grasp Arabic sciences. There never appeared among them, any actual scientist, except for *William of Tyre* who was one of the most famous medieval historians. In addition, the crusaders never enjoyed during their stay in the East any kind of peace nor had a good chance to study or learn enough.

Translation Movement

In addition to these three passages, there existed in the Middle Ages a regular plan for translating Muslims' knowledge to the Latin language. The Europeans became fond of studying Muslims' sciences with great enthusiasm that left an obvious effect on European thinking. After the Arabs had translated the ancient world heritage in science, art, literature, math and philosophy, they translated books about chemistry in ancient Egypt, Greek books of medicine, math, astronomy, geography, philosophy, literature and music. They also translated Persian books of literature, poetry, history, biographies, and astronomy, Indian books of medicine, astronomy, math, history, literature, and music, and Nabateans' books of peasantry, magic, and idols. Consequently, they had a complete, comprehensive knowledge of the human legacy as a whole. Indeed, many peoples in the east Mediterranean region contributed much in laying the basis of human civilization. When both Egyptian and Babylonian civilizations became in need of a new impetus, their peoples found it in the Greek civilization. Yet, the moment when Greek found their civilization beginning to pass away, they got a new push from the Arabs who resurrected it, and hence, transmitted it to Europe. It is evident that the great renaissance of Europe since the 12th century closely relates to both the Greek and Islamic heritage by means of a wide movement of translation from Arabic and Greek languages.

The West knew Arabic sciences via translation in the middle Ages. In the 11th century, we observe that the Carthaginian *Constantine* spent

thirty years roaming in East and North African regions for studying Arabic medicine. Then he went to Salerno to study the material he gathered before, lastly settling in a monastery to translate what he collected of Arabic books into Latin. Besides, the English *Abelard* studied, during his tours to Spain and the East, Arabic mathematical and astronomical books and translated them into Latin. Moreover, The bishop of Toledo established a translation school for translating books of ancient Arab philosophers into Latin. Hence, Europe received Muslim sciences, studied and benefited from them. However, the European renaissance was not the making of one single civilization. Great ideas that cause major human movements are always the sum up of successive generations' efforts, the renovation or enlightenment western movement is the fruit of multiple collective efforts that produced a chain of great achievements. Great ideas that affect humanity causing major movements between human beings are always the result of multiple efforts exerted by many generations. The western innovation - or enlightenment - movement was not accomplished by one single country or region, but it is the outcome of a joint work wherein several generations and nations cooperated. Arabs benefited much from other civilizations, and then strived to add to, and renovate what they gained from others, the outcome was a civilization that became the mother civilization illuminating the whole world, and laying the bases for all civilized progress that followed.

Chapter Two

Evidences Emphasizing the Impact of Arabic Legacy On European Intellect

It is a well-known fact that each civilization had benefited from efforts of its predecessors, otherwise it was impossible for the world civilization to grow up or develop. Without making use of the ready heritage of past civilizations, every civilization would have found it inevitable to begin from zero point instead of building on a ready and available foundation.

Arabs grasped and assimilated the Indian, Persian, and Greek intellectual creations. They were not only responsible for preserving that ancient heritage, but they also added great contributions to it. Moreover, they corrected its course in different ways, rendering it of great help in assisting much in the emergence of the renaissance in Europe in the 15^{th} century.

Muslims provided the human culture with a great heritage in different fields of science, culture, and literature. Their books were the principal references to translated into Latin for the benefit of the Europeans. They were considered for centuries the original light sources that guided scientists and researchers in European universities until the era of renaissance. We shall review the evidences, confirming the influence of Islamic intellect on the European one. We shall also point out, the contributions of Muslim scientists in establishing modern sciences, particularly in the fields of literature, philosophy, geography, history, arts, music, mathematics, astronomy, chemistry, physics, medicine , pharmacy, and other branches; a matter that had the greatest impact in assisting the emergence of modern European renaissance.

Literature

What Arabs offered to the European renaissance in the field of literature -particularly poetry- is different from any other field of sciences. Poetry of any previous civilization had not the least effect on Arabic poetry. Arabic poetry - created in the deserts of the Arabic peninsula - came only from those influenced by Arabic civilization. In the *Abbasid age*, literature was highly developed and poets adopted new styles regarding poetical meanings, subjects, and techniques, beside developing other different poetic arts suiting the Abbasid prosperity and civilization, specially in *Baghdad*.

The most famous poets in that period were:
Abu Nawwas, whose poems in love, wine and hunting were so popular. *Abu Tammam*, was famous of his mental, and philosophical tendency in poetry. *al-Bohtory*, with his immortal poetic praises. *Ibn el-Roumy*, known of his profound poetic creations. *Abu el-Attahyia,* famous for his poetry in wisdom, fine love poetry. *al –Mutanabbi,* known of his pride, self esteem, and extreme talent. *Abu el-Alaa' al-Ma'ary*, the poet of wisdom and intellect.

There were also female poetesses, and writers, who played obvious roles in the literary arena such as *Raba'a el-Adawyia* who committed herself to the love of God and sophism, princess *Alyia Bent el- Mahdy* of fine poetry and lyrics, *el-Abbassa bent el-Mahdy*, with the mysterious stories about her that relied heavily on imagination and *Aida al –Jahania*, who *El Siouty* described as a learned poetess and a significant writer.

European literatures were influenced by Arabic literature during the Middle Ages and the beginning of the Modern Ages, as we can see obvious Arabic influences in the poetry of love, popular verse, and proverbs. Islamic stories also became so famous and flourished in Europe in the 12th century. The Europeans became fond of Arabic literature for its creativity and originality. The orientalist Professor H. A. R. Gibb assured that in stating: "*The best thing that Islamic literatures granted to European ones was their influence on culture and intellect in medieval poetry and prose*". Oriental sorts of literature that had similar ones in Western literature were the real key of Europe to enter the world of Arabic literature, where Europeans found great interest in and appreciated so much. *Dante*, the Italian poet, stated that Italian poetry was born in Sicily where the Arabs were having a booming civilization and became common in *Provance* territory in south France from which it was spreading by ambulant poets named *The* Troubadours. Arabic poetry contributed to some extent, to the rise of the new types of poetry in Europe, especially these Provencal troubadours - whose poetry and music owed so much to the Arabs-. Arabic poetry was cultivated in the court of Alfonso the Wise of Castile and of the Norman kings and of Frederick II of Sicily. The troubadour poetry that appeared in Sicily in the royal court of King *Frederick The Second* was quoted from Arabic Andalusiain literature that was distinguished with

extreme romanticism, fine love, weeping lamentations, chivalry traditions, suffering of needs, and praising feminine beauties.

The orientalist *Robert Briffault* emphasized by saying that "*Trobadour* verse was the offspring of Arabic poetry and was welcomed by Andalusian literary men as a new form that was deemed a literary revolution".

Europeans were extremely fond of Arabic literature, (Alf Laila wa laila) The one thousand and one nights (The Arabian Night) was published several times in both English and French. Europe was acquainted to the name of *Omar el-Khayyam.* Some European writers quoted Arabic literary subjects and passed them to Western literature. The Italian writer, *Buccacio*, one of the well known figures in the Italian renaissance, built his book *Ten Days (Decameron)* on the tales of *The Arabian Nights* that were widely spread in Egypt and El Sham. The Decameron included one hundred tales mimicking the style of the Arabic one and were ascribed to seven females and three men settling in a remote retreat in some cities districts escaping from the plague epidemic. To break the boredom each of them had to relate a story to the group every morning by turn. Those tales spread in Europe and inspired the English Playwright *Shakespeare* with the subject of his play *All Is Well That Ends Well.* Another group of orientalists considered that *Gulliver's travels* written by Swift as well as *Robinson Cruiso* by *Defoe* derived their ideas from *The Arabian Nights* likewise.

Islamic poetry and prose heavily affected Italian poetry as vividly appeared in *La_Commedia* of *Dante* (1265–1321) who lived in Sicily during the reign of King *Frederick the Second* - and who was a lover of Islamic culture-. *Dante*'s comedy was considered the masterpiece of European literature and poetry in the 14th century. In that heroic epic, he described the hereafter in a form that exposed his ingenuity as a poet. At first, he imagined himself in hell and then was transferred to Purgatory and Paradise describing- their joys and miseries-. He also imagined that the great poet "*Virgil*" accompanied him in his journey as a guide. Throughout his work, *Dante* could embody what he imagined with great intelligence in an attempt to explore the secrets of the afterlife.

In comparing this comedy with Risalat al Ghufran (The Epistle of Forgiveness) written by the great Arab philosopher and poet Abu al-Ala' al-

Ma'arri of Syria (973-1057). We can observe how much the latter inspired *Dante* with much of his concepts.

Divine Comedy also quoted from a book called Meccan Conquest, by *Mohei Eddin Ibn Arabi* - The Andalusiain Muslim philosopher- which he wrote twenty -four years before Dante's birth- and also from the concepts of *Ibn Massara*, the professor of *Ibn Arabi* and the father of the well-known philosophical school. A comon spirit pervades the two poems, with regard to the moral meaning emanating from sophism. *Dante* also took from *Ibn Arabi* and *Ibn Massara* their thoughts about paradise and hell– a fact emphasized by many orientalists; the most prominent one was the Spanish priest *Miguel Blathius* in his book *Islam and_The Divine Comedy*. In the introduction, he states, "*undoubtedly* Ibn Arabi *and his professor* Ibn Massara *were pioneers for* Dante. *Also, the* Comedia *itself is a story adopted from another one known in religious Islamic literature; namely* The Meraag Story". Accordingly, Islamic principles formed the basis on which *The_Divine Comedy* was built, and it was affected with Islamic thinking, when Dante tried to represent European Medieval concepts concerning the afterlife. *Dante* derived directly and indirectly from Islamic sources the thoughts of his poem. He also admitted his use of three translations of the story of *Israa and Meraag* in Spanish, Latin and French. The three translations were ordered by the King of Toledo *Alfonso the wise* and were published in Madrid under the title *Mohamed's Meraag*.

European literature was influenced by Arabic prose, particularly stories of animals with the vivid examples of translating the famous collection of *Kalila and_Demna* into Spanish and also the stories of *The Seven Wise Men*, and the stories of *Sindbad*.

There are three groups of novels of oriental origin that influenced European literature in the Middle Ages: the first one is *Kalila and Demna* which has an Indian origin and reached Europe only via the Arabic translation by *Abdullah Ibn el-Moqaffaa'*. On its emergence, the Europeans considered it an ideal didactic book narrated by animals and birds. Since then it was translated into more than 40 languages, and was imitated by the Europeans in their stories such as *The Book of_the beasts* written by the monk *Ramon Lull* and some stories of *Boccaccio in his_Decameron (The Ten Nights)*. Besides, the general form of a number of Italian stories

conformed with both *Kalila and Demna* and *The Arabian Nights*. In addition, *Sindbad* was also translated in the language of Castile in 1253 under the name of *A Book On Women's Conspiracies and Tricks*.

As for philosophical stories, Arabic stories deeply affected European intellect. The most prominent example was the beautiful Arab novel Hayy Ibn Yaqzan ("Living, Son of Awake") written by the great Arab Andalusian philosopher/physician Mohammad Ibn Tufayl (1109-85) (1110 – 1185) that concentrates on the reconciliation between religion and philosophy as pure mental contemplation and true faith are two ways leading to one result, which is, communication and unity with God . The Spanish *Pilayo* – in his book *Origins Of_The Narrative* – described it as a masterpiece of Arabic Literature; It was translated into several European languages, the first of which was Latin in 1671 and then into English, Dutch, German, Spanish, French and others. The story was also imitated by a Spanish writer called *Gracian* in his book *The Critic* . The amazing resemblance between the two works, was also asserted by the Spanish researcher *Pilayo*.

Another point that can clarify the effect of Arabic literature on European literatures is the fact that these languages, particularly the Spanish one , have quoted many Arabic proverbs as mentioned by the orientalist *Gustave Lebon* in his book *Arabic Civilization* .

Briefly, it can be said that Spanish narrative literature since the 14th century until the 17th century was affected by collections of Arabic stories in a clear, evident way. The Spanish stories of cunning also shared similarities between their characters and those of *The Arabian Nights*. The story of *Antara,* and what it includes of courage and chivalry was of great interest and was subject to imitations.

European languages include a good deal of Arabic words; some of these words are still available while other words were slightly modified.

Here are only a few examples of those words that were common in the English language and some other languages: *cotton, musk, suffron, syrup, jar, lemon, and sugar*.

Medieval European absorption of Arabic literature subjects, was among the aspects of the intellectual movement in that period, particularly under the restricted church systems, and the lack of creativity in Latin, a situation that urged people to resort to the Islamic world as being superior in literatures and sciences at that time.

A number of researchers and European orientalists appreciated the influence of Arabic/Islamic civilization on the European one. Among them, we remember the Jesuit Spanish father *Juan Andres*. He published between 1782 and 1799 a book in Italian in seven volumes entitled *Origins Of All Literatures, Their Development and Current State*. Then he published it again in Rome between 1808 and 1817 after expanding it into eight volumes where he confirmed that European renaissance was based upon the heritage of Arabic/Islamic civilization in all fields of science, literature and arts. In this book also, father *Andres* indicated the effect of Arabic poetry on the beginning of European lyrical verse – a fact stated by the orientalist *Nykl* in his study on lyrical poetry where he included evidences about the impact of Arabic poetry on *The Trobadour* poetry.

From the above, we can see the huge extent of influence that Arabic literature exerted on European literatures in The Middle Ages. In fact, Europeans were always interested so much in Arabic literature to the degree that its relation with modern European literatures continued until now. There still is a strong bond between both to join the East and the West across different periods and generations.

Philosophy

The effect of Muslims in European philosophical intellect in the middle Ages was great. Andalusia was among the major centers affecting Western intellect as it introduced oriental philosophers to Europe. It is known that the spirit of religious and philosophical research was common in the Islamic Caliphates' era due to the flourishing philosophical doctrines of Muslim scientists. It is also known that Islamic East was aware of the activity of Greek philosophers, mainly Aristotle and transmitted that heritage to Europe.

In other words, the European translation of Arabic philosophical concepts led to their study of Greek philosophy.

Roger Bacon confirmed the idea that much of *Aristotle*'s philosophy rarely affected the West due to the loss or the scarcity of its records till the appearance of Muslim philosophers, who transmitted, explained, reviewed, and displayed it in a clear way. The Abbasid era was the peak of interest in the Greek philosophy, mainly in the reign of *ar-Rashid* and *al –Ma'moun*.

ar-Rashid established "Bayt el Hekma" Wisdom House in Baghdad where he collected the books written in and translated into Arabic, and made it a center for translating a number of Greek and Indian books. Then *al – Ma'moun* expanded that school and recruited there a large number of the famous scientists of his era, which made it an important center for translation, copying, reading and composing. From that school emerged the names of *Honein Ibn Ishaq* (809 – 873) who translated from Aristotle works The Sayings, Physics, and Morals into Arabic. *Honein* also translated works of *Plato* ; namely The Republic , and Laws into Arabic . His son Ishaq translated Metaphysics into Arabic as well.

Ibn Sina (Avicenna) (980 – 1037) , the pioneer of philosophical research in the Islamic world - who was called the *Boss* - , offered some important explanations of Aristotle which highly affected the European concepts. The Latin West transmitted his views, studied his books and commented on them.

There was a special school of *Ibn Sina (Avicenna)* that taught successive generations of students. Through it, he could penetrate into verbal and mystic studies in a time when philosophical research was prohibited.

Ibn Sina's (Avicenna) special philosophy included three main issues: emanation, human self, and the theory of illuminating knowledge, along with what it contains of views concerning prophecy, miracles and mysticism.

As for his compositions, he wrote "The Recovery" that includes four sections: *Logic, Physics, Math,* and *Theology*. Some parts of the book were translated into Latin and some modern European languages. He also wrote the book Salvation, as a summary of the *Recovery* book.

The book called *Indications and Instructions,* is considered the most important book by *Ibn Sina (Avicenna)*. One of his students said that he restricted the use of this book only to his close scholars, eventually the book had been translated into French.

His book *Wisdom Eyes* included studies in logic, physics and theology, Dr. *Abd El Rahman Badawy* published the book in 1952. His famous work "*The Law* in Medicine" contained messages about, limits, mental sciences, and answers to questions formerly posed by Abu Ar-Rayhan al Bayruni.

Al-Farabi – who lived in the period of reunion between new Arabic/Islamic civilization and the Greek one – explained Aristotle's philosophy and commented on it to complete the missing points. In fact, his explanations were often more comprehensible than the original text and more rational as he managed to change mere opinions to purely rational theories. In that way, there appeared the quality of both civilizations in his research subjects and its linguistic, literary, or religious examples, versus Greek language, emerged the Arabic language, also Arabic literature and Islamic sciences appeared versus Greek literature and sciences. This means that *al-Farabi* did not only explain Aristotle's meanings, but also was displaying meanings, and if the wording did differ, still the meaning is the same. He not only explained the text, but also reviewed its subjects and meanings in a rational way. *al-Farabi* did not follow Aristotle, but was displaying his subjects and meanings, and dealing with them in a holistic attitude quite independent of expressions, words, or terms. He, dealt with Aristotle, either explaining a book as the case was with "Sayings" and "Expressions", clarifying Aristotle's intentions as was the case with "Metaphysics", or clarifying a certain science, or a branch of a science as in the "Interpretation". Besides explaining Aristotle's doctrine in general, he also compared him with others within the Greek philosophy, using not only Aristotle's texts, but also using different interpretations of them.

Thus, *al-Farabi* was one of the Arab intellectuals who played a great role in the field of philosophy; He could emphasize the unity of the human mind and the possibility of communication among different peoples.

Muslim philosophers in Andalusia enjoyed an unprecedented intellectual freedom and affected the European intellect. Among them were *Ibn Maga, Ibn* Tofayl, and *Ibn Rushd (Avirroes)* who is considered the most influential one in West Europe as the senior exponent of Aristotle's philosophy and the most famous Arabic scientist whose books were translated into Latin. His concepts were studied in European universities till the 16^{th} century, this makes it necessary to talk about him in some more detail.

Abu El Walid Ibn Rushd (Avirroes) (1126 – 1198 A.D.) is one of the great pioneers of enlightenment in the world history. He was highly estimated in Europe before being known in Arab and Muslim countries.

He offered superior works for human intellect and tried to use his concepts and compositions as a link in the inter-dialogue between civilizations, cultures and religions. He firstly worked as a judge, was interested in Islamic Jurisprudence (Feqh) and benefited from studying Greek philosophy in general and Aristotle's philosophy in particular. In his books, he called for studying other sciences of the other peoples - as an inevitable necessity -, warned against any argument that is not based on rationalism. In Islamic Jurisprudence, moral, philosophical, or logical; issues, he resorted to making use of measurement, interpretive judgment, interpretation, and argument. *Ibn Rushd (Avirroes)* is also considered the top of the those who explained the books of Aristotle in physics and metaphysics , logic and psychology. His logical explanations are distinguished with deep comprehensive reviews, and fine presentation.

For more than a thousand years in the middle Ages, Europe knew nothing about Aristotle until *Ibn Rushd (Avirroes)*'s researches and explanations that were translated from Arabic into Latin reached there. There are still some of them - in different forms - preserved in Latin without finding the original Arabic texts. We can state that *Ibn Rushd (Avirroes)* was known in Latin more than he was in Arabic.

His influence on European intellect was also extended to modern history. The French philosopher *E. Renan* could display honestly this fact in his book about Ibn Rushd, "Ibn Rushd, Rushdans, and Latins". In this book he had two different openions about Ibn Rushd, sometimes saying that Ibn Rushd did not imitate any of his predecessors and in other times he states that his philosophy is a mere copy of that of *Ibn Sina (Avicenna)*. However, during the period of three centuries from the 14^{th} century to the 16^{th} century, *Ibn Rushd (Avirroes)*'s disciples continued to study, make researches and spread their mentor's instructions.

All that contributed to the appearance of the renaissance period and the modern history of Europe, so that *Ibn Rushd (Avirroes)* became distinguished not only for his being the greatest interpreter of Aristotle but also for what the theory that characterized his philosophical doctrine, a theory of reconciliation between faith and reason

The Spanish orientalist *Palacios* was more fair in his evaluation of *Ibn Rushd (Avirroes)*. He affirmed that father *Thomas Equines* (1225 – 1274) – the main foe of *Ibn Rushd (Avirroes)* in the christisn world – had much benefited from *Ibn Rushd*'s books in drafting his philosophical religious doctrine. *Thomas Equines*'s book "Summation" includes some Islamic concepts that stressed *Ibn Rushd*'s impact on the European mind. *Palacios* also maintained that *Thomas Equines* adopted *Ibn Roshd*'s theory of reconciliation between faith and reason, and that human mind is unable to approach the secrets of God.

Hence, the Cordoban philosopher *Ibn Rushd (Avirroes)* participated in adopting and enriching the civilizations' dialogue. He proved that it is a relation of a peaceful, continued dialogue, not of conflicts and disputes. He skillfully managed to support, and document it to restore the link between both Arabic/Islamic civilization and the Greek one in a precise, scientific comprehension of their dialogue and its materials – an attitude he ensued in his explanations, comments and summation of *Aristotle*.

Ibn Rushd (Avirroes)'s dialogues are more comprehensible than that of *Ibn Sina (Avicenna), El Farabi* and *El Safa* brothers. He also found no opposition between human thinking and the Islamic code (Shareia'a), and so called for the use of rationality in proving religious matters. He proved that Islamic civilization is based on reason, and there must be open chances for every scholar to reach the real facts. He, also, criticized some of *Aristotle*'s ideas through his explanations of his philosophy – an attitude that the church sound threatening to its constants, provoking varying responses. These varying responses from the side of the church, did not stop many of the European thinkers - who formed the nucleus of enlightenment – from adopting Ibn Rushd's philosophy, sticking to it, and defending it.

Although Ibn Rushd criticized *Aristotle*, he revealed some of the significant aspects of his views he admired and presented them in a simple, clear way. Those explanations granted him greater success and fame than his fame in the other fields like medicine, especially, for his estimating highly the role of mind, and using ration as the real measurement for true knowledge.

Regarding his special books, the most famous ones are *Tahafot El Tahafot*(collapse of the collapse), *Revealing Evidences Methodology, a*

Message about Ancient Science, The Essay about *"The decisive opinion about the relations connecting Wisdom, and Islamic Code", "Introductions in Islamic Jurisprudence"* , *"The collection",* and other books and articles in Medicine and Logic. These books have been translated into Latin after the head of the church in Toledo assigned a Dominican group to learn Arabic in order to translate Islamic books, primarily those of *Ibn Rushd (Avirroes)* into Latin.

Beginning from the second half of the 20^{th} century, European intellectuals' view of *Ibn Rushd (Avirroes)* began to be fairer. They accepted his views as a sort of understanding the others' points of view. In this respect they did not pay attention to the former dispute between the differing reactions to his philosophy in the European world among clergymen and liberal intellectuals (calling themselves the Latin Rushdins) - who relied on his analysis of Aristotle to oppose the church -.

So, *Ibn Rushd (Avirroes)*'s philosophy was one of the philosophical currents that helped to form the human intellectual philosophy and incite arguments between enlightenment's supporters and foes, to a degree that allows us to consider his philosophy as one of the roots of European Enlightenment. He added a critical principle to his rationalism doctrine that forced Western philosophers to acknowledge it.

He also was the first in the history of Islamic/Arabic intellect to approach politics in a candid discourse that included a bitter criticism of political and social systems; he exposed the frank violations of human rights, and principles of freedom, equality, and social justice. In addition, he defended women, putting them in a better position and stating their latent ability to perform great deeds.

The world today is in urgent need to benefit from his call to open exchange of ideas among nations.

To sum up, *Ibn Rushd (Avirroes)* is the most eminent philosopher known in Arabic/Islamic culture and the pioneer of the Enlightenment philosophy in Latin Western intellect. This may be the best answer to the idea of civilizations' conflict that some westerners are spreading now, as civilized and enlightened human thinking must always depend on dialogue, not conflict. Humanity is past the ages when strong barriers separated great cultures, preventing any communication or exchange. We now believe that

old civilizations gave and took from each other. Modern civilizations must follow the same give and take pattern

Geography

There is no doubt that, the extension of the Islamic state over extensive areas in both Asian, and African continents, made it necessary for Muslims to know everything about the opened countries, and the routes linking them, and the distances separating their different regions. They were also in need to have detailed and accurate knowledge about places, peoples, and products.

Arabs' profound desire for knowledge, led them to be acquainted to the cultural heritage of both Greek, and Roman civilizations. Their desire to build a world civilization was not restricted within their local boundaries, as they continued to transmit the treasures of ancient knowledge from West and East, they added to these sciences what contributed to the human progress. Their writings were among the basis that provided European renaissance with its main fundamentals. Hence, scientists agreed that Arabic/Islamic civilization deserved a place of excellence among great civilizations in the human history.

Of the famous scientists who added to the new geography through their observations in astronomy and trips were *al- Ya'coubi* , *al- Makdesi* , *Yakut* , *al- Mas'udi* , *al- Idrisi*, and many others.

al-Ya'cobi, was one of the first Muslims interested in geography. He dealt with geography in a very clarifying manner. He mentioned the names of cities and kingdoms, their locations, distances between them, descrying natural characteristics of those regions and their climates.

Shams el-Din al-Makdesi, *was* among the first geographic scientists who considered geography a science that has to be known by every trader, traveler, king, judge, religious man and others. His book *The Best Divisions in knowing Regions* is on the top of a series of Arabic geographic works known as *Islamic Atlas*, which contained maps and descriptions of Arab countries. He mentioned most Islamic countries he visited; each region with its natural geography followed by the human geography, and ended with describing the system of administration, then people themselves, their conditions, clothes, foods and drinks. The introduction of His book *The Best*

Division is considered a piece of fine geographic literature. It was translated into English by *Kramer* in 1877, into Italian by *Natallino* in 1895 and into French by *Jean Soufage* in 1964.

In fact, that book is a report on the world as was seen by *al-Makdesy* who suffered much troubles and was threatened by many dangers on writing it. The orientalist *Shpringer* descriped him as, the greatest geographic scientist humanity had ever known. As for the orientalist *kramers*, he said that he was the most original Arabic geographic professor who taught Europe the art of geography.

Yaqut's geographic encyclopedia (Lexicon of the countries) included all medieval information about the terrestrial globe, from the aspects of astronomy, physics, history, and others.

Al-Mas'udy Is the author of the encyclopedia called *Meadows of Gold and Mines of Gems*, which is considered a reference book, about world medieval civilization. It demonstrates the writer's accuracy for being a geographic traveler, a historian, a physical scientist, a scientist in botany and zoology. He introduced this book by speaking about the form of earth, its cities, wonders, seas, rivers, mountains, marvelous metals, islands, lakes, and stories of the great buildings. He drafted a map defining each of the Mediterranean Sea, the Black Sea, The Rivers Nile, Send and Kang. Then he turned to the news of the world peoples, prophets, pagans, religions, doctrines, news of Egyptians, Babylonians, Assyrians, Greeks and Romans. Finally, he entered Islamic history until the age of the 23rd Abbasid Caliph.

Al- Sharif Abdullah el -Idrisi (1099 – 1166) was the most prominent Muslim geography scientist, and the most influential among them, it was he, who had the greatest role in innovating that science, so that he was known as the professor of geography who taught it to Europe rather than *Ptolemy*. He made several journeys to many countries of the world like Morocco, Portugal, Spain, Greece, France, Italy, Egypt and Asia Minor. Then he settled in Sicily under the auspices of its Norman king *Roger the Second*, who admired very much the Islamic literatures, and sciences. The king asked him to draft a map of the terrestrial globe. There he composed his book *The Pleasure Excursion of One Who is Eager to Traverse the Regions of the World.* He described in great precision, the cities of the world known at that time, and insisted on the idea of the globosity of the earth,

which made his book the most complete and comprehensive geographic research that Europe inherited from the Arabs. The maps he drew exceeded forty in number, and are at the top position of the art of cartography in the middle Ages. They are currently preserved in some European museums: one is in the French museum *St. Martin* representing the Nile River as coming from the lakes southern to the equator, a matter that put an end to the controversy about Nile current and flood sources.

From the maps drawn by el-Idrisi, and the opinions adopted after Arabs, *Columbus* based his imaginary picture of the sphere that represented the earth as an elongated pear tree; the map that inspired this idea was that of cardinal *Boutros* called *The World Map* that relied on Arabic sources. This map was published about 80 years before *Columbus* which proved the contribution of Arabic geographers in the discovery of America. Unless the Arabs believed that the earth is a sphere, Columbus might have never thought that the direction towards the west would lead him to India. He also might not have been able to reveal anything about the new world. Arabs thus played a great part in discovering the western hemisphere. Moreover, *al- Idrisi* drafted a map of the earth on a large board and managed to copy it - through complicated calculations - on a sphere of pure silver prepared by *Roger the Second.* On that sphere, he put the locations and drafted the continents, seas, and rivers with great precision. He revealed facts about upper Nile sources, then he turned the spherical map into a flat one, and divided it into seven sections reviewed on the equator and two sections south of it; those are the famous seven regions in the northern half of the earth that originated in the views of *Ptolemy*. He then divided this map into longitudinal sections, by parallel vertical lines, which were the longitude lines. He, thus, obtained seventy square sections and drafted each in detail, describing its human and physical geography. He recorded that description in his book *The Pleasure Excursion of One Who is Eager to Traverse the Regions of the World*. As a result, Europe appreciated the efforts of *al-Idris*i as an outstanding personality in human history, and published his books because of their scientific precision.

Shehab el -Din Ahmed Ibn Maged was the Arabic sailor who is considered the first to write about the subject of sea sciences. Among his thirty books, *The Benefits* is the most important one that was published by

the French orientalist *Gabriel Ferrin* (1921 – 1923). It included most theoretical and scientific information of interest to seamen in The Red Sea, Indian Ocean, and China Sea as he gathered his great first hand experiences that he acquired in navigating through those seas, depths, islands, ports and the winds blowing there.

It is known that the Arabs used the magnetic needle, and the compass, in their scientific and commercial travels. In addition, they knew about the stars, their rising and setting, and using their clusters to identify the directions on the high seas.

Such efforts of the Arabs proved their contribution to develop the science of geography. They also stated the spherical shape of the earth, contrary to the church, that considered the earth flat. Some Arab scientists also tried to explore the Atlantic Ocean, the so-called *Sea of Darkness*.

Through Andalusia, the Europeans happened to know the compass after the Jews – who knew about it from Andalusian Arabs - revealed its secrets to them and taught them how to use it. The compass still has its Arabic name in some European languages: it is *Boussole* in French and *Bossla* in Italian.

So we can see that, Arab scientists enriched the human heritage with the writings they left, the systems they invented, and the maps they drafted, which helped later discoverers to travel all over the world exploring the unknown.

The Arabs' first favor on Western civilization was, preserving its basis, without the Arabs, interest in transmitting Greek sciences to Europe, there would have been no link between European present and past.

When Islam emerged, it found the spirit of scientific research in Europe halted by the refusal of the first decades of Christianity to approve the efforts of Greek scientists. Arabs came out to link the old science with the new one, and add to this new science in its different aspects, and then conveyed it to Europe to contribute in the building of its renaissance.

European travelers relied much on Islamic sources in their exploring parts of the earth unknown to them. That was evident in the case of *Marco Polo* whose information was collected from the sketches of Muslims in Ceylon. Without the instructions of the Arab seaman *Ahmed Ibn Maged* to *Vasco Da Gama* ,the latter would have lost his way during his journey to

India. Furthermore, Arabs' superiority and cleverness in cartography helped European travelers to define their ways. Arab's insistence on the globosity of the earth also helped *Columbus* to know that moving west might lead him to India.

History

History is one of the most important and most useful human sciences. As a social, political and economic activity, it began with the first existence of human communities, as it was important to suffice the needs of these communities to know about themselves and their surroundings.

Besides dealing with the human race with all its complexities and variations, history provides humans with a treasure of endless experiences. History experiences enable humans to make deductions and reach results without spending time and effort to go through similar experiences once again.

It was therefore natural, that history had such a prestigious position in the flourishing Islamic cultural movement.

Muslim generations, and nations, during the 9th and 10th centuries A.D. were linked to the role they have to play in the human history, by the key role that their historians played. Muslim historians also wrote the world history since Adam and Eve, and then the prophets - a task facilitated by the Islamic world unity and the available freedom to travel all over the world seeking knowledge-.

al –Ya'cobi, in his works, like his book *Countries*, reveals the concept of world history which dominated all historians of that age.

***Mohamed Ibn Garir el- Tabary*'s** book *History of Prophets and Kings* depicts the general trend created by the unity of the Islamic world.

al-Balazory In the book *Countries Conquests*, reveals the glory of Islamic conquests and the positive response of several peoples to Islam.

Ibn el -Atheir, In another book called *Al Kamel in History,* viewed the essential concept of history of Muslims. It maintains that the world history is divided into three ages, beginning with the early ancient history, then the era of the prophet, and finally the world history since the prophet's death until the end of time.

Abi el-Fedaa, wrote a *Summary of Human History*, a book on world history with special focus on the events of El Sham countries, Memelukes and Monguls age.

Al- Massoudy's book, *Golden Meadows* is a review of the history of West , North Africa and East Europe.

Abd el-Rahman Ibn Khaldoun (1322 – 1406) - the author of *The Introduction* -is one of the world's top historians. He gave history a philosophical spirit based on the motives and incentives affecting humanity. He described the cycle of human development from nomadic life to civilization. The former - for him - is a very simple, primitive life represented in Bedouins and peasants who reproduce and flock together to be able to dominate lands, and establish states, aiming at eventually reaching a stage of settlement, civilization, and prosperity. They depended on mercenaries to achieve their final settled state. Due to their new style of life, their cycle deteriorates because they became so refined, and missing crude strength and stamina that they previously had, in their primary struggle to shift from nomadic life, to established states. On reading his book *El Eber* (warning examples), one feels like reading a scientific history of early ancient ages, as he knew the Greeks well, and differentiated between them and the Macedonians. He was also aware of the rudiments of Roman history, and the development of their states from the kingdom to the republic and finally to the empire. The reader of this book feels like reading a book combining history, geography and sociology. He, does not set theories, but writes history, studies, analyses, and comments on the reasons of the events, the fall of nations, origins of sociology, besides giving a clear picture of ancient, and modern kingdoms. All that led European researchers to state that ***Ibn Khaldoun*'s** *Introduction* is the basis of history, and its cornerstone for including a detailed analysis of political, social, and economic factors influencing the structure of political units, and the states development.

His ***Introduction*** initiated the novel original science of **sociology**. His theory in the history of philosophy is considered the oldest one in this sphere, wherein he attempted to spot the reasons that lead historians to make mistakes in recording history. From *Ibn Khaldoun*'s point of view, the most important of these reasons were their ignorance of the nature of the social

systems, and the rules governing them – a situation that led to the necessity to allocate a science for studying Sociology, before recording history. In that particular respect, *Ibn Khaldoun* resembled *August Kant* -the father of Sociology according to the Europeans -.

While *Ibn Khaldoun* considered Sociology a means for correcting history, the French philosopher *Montesqueau,* considers history, the basis for building the science of Sociology.

It must be mentioned that Medieval European historians began to study Islamic history in a later stage; their interest to study it began after the restitution movement in Spain, when Sicily was restored and dominated by the Normans. The Europeans' knowledge of Arab/Muslim history increased with the beginning of the Crusade expedition that started the armed friction between the East and the West. The movement of historical recording in Islamic east was also influenced by those wars.

The challenge imposed by the Crusade wars as an imperial attack lead to concentrating on military heroic characteristics. In wars, it is customary that nations need heroes, and heroes' tales, this was also the case in crusades when the need of heroes emerged to satisfy the nations' needs – an attitude that was expressed in historical writings -.

Historians were interested in the deeds of those heroes, particularly *Saladin* who succeeded in restoring Jerusalem from crusaders. Among those writings was the book *Josephic Merits and Sultanic Anekdotes* that deals with Saladin's personality and his role in the struggle against the crusaders with a review of the events of the crusade wars in reviewing his life. There also appeared among crusades Western historians *William of Tyre* who is considered one of the first historians much influenced by Arab/Muslim historical studies, and among the first people to introduce Islam to the European countries, with its states, peoples, governors and history.

After that, the orientalist movement in Europe began to gain interest in studying history as a general basis for a deep study of Arabic/Islamic history. Orientalists started to read Arabic writings, translate the original historical texts, and publish them, until they finally could write about Arabic/Islamic history depending upon the original Arabic references. In that way, the orientalistic movement entered a new stage in studying the origins of Arabic/Islamic civilization.

In short, Muslims, not only left a huge historical wealth, for the new historians, but they also, managed to expand the limits of historical research, verified, and increased works in that field, to a great unprecedented extent.

Arab/Muslim historians strived much to prove that the duties of the historian are, to tell the truth, to judge unbiased, stick to objectivity, and review facts precisely.

Arts and Architecture

It is evident that the Arabs benefited from the arts and civilizations of the countries they opened, mainly Persian and Roman. Then they transmitted them to Europe after adding their creations and innovations that had a deep impact on European taste.

Islamic art began its first steps influenced by the forms found in the countries they opened, and then it developed in order to express the Muslims' human views of life and the world. It was characterized and distinguished with the Islamic personality and spirit.

Muslims were firstly interested in building and ornamenting mosques. Because pictures, paintings, and statues were prohibited inside mosques, another outlet to perform arts was sought, this lead to the emergence of the core of the Islamic art, which was limited inside mosques to decorating the ceilings and pillars with Quaranic verses, geometrical sketches, and chandeliers.

Other than mosques, Islamic art in palaces -as well as social and other Islamic establishments known in the Islamic world- offered to Muslim artists a vast arena to express and practice their talents; they succeeded in mixing Eastern, and Western arts in one unit, endowed with their own flavor. Accordingly, the emergence of this art was indebted to the Arabic taste, even though it was influenced by the civilization of the opened countries, particularly Persia and Bezant.

Islamic talent included all sorts of arts such as painting, drawing, ornamenting, architecture, and music. In the sphere of paintings of man and animal, Muslims did not prohibit it -though was not approved by earlier Muslim orthodox thinkers-, this lead to the appearance of drawings in the countries where Islam had settled states. That art expanded in both Umayyad and Abbasid ages. Human portraits were discovered on the walls of some palaces in East Jordan, and Samaraa'.

In the field of ornamentation, there are the walls of Umayyad mosque in Damascus, the Rock Dome in Jerusalem, and al-Nabawi mosque (mosque of the Prophet) in Madina that were adorned with beautiful mosaic decorations; most of them are of plants, these decorations are spreading an air of joy and calmness. Moreover, some Sultans' palaces were ornamented with drawings and sketches described as Islamic art language.

In the Abbasid era, the arts of drawing, painting, portraying, ornamenting, and sculpting, spread and reached its climax in the palaces of Abbasid Caliphs, and continued to grow marvelously.

In the Fatimid era as well, the art of drawing was developed largely.

In Andalusia, the colored paintings spread widely, ornamenting the ceilings of palaces, the king's palace in El Hamra (hambra) was decorated with color paintings depicting Arab knights riding their thoroughbreds, while others were directing their spears against their enemies, there were also drawings of feminine Arabic beauties, different animals, various trees and plants. Those paintings were examples of creativity, and uniqueness, and definitely done by Arabic hands, -though some Europeans denied this fact- , the evidence for that was the fact that their colors and techniques of drawing were purely Arabic, only Arabs could draw their knights attacking their enemies.

In the *Louvre Museum*, there is an artistic wooden cylinder on which was engraved the pictures of women playing music, beside pictures of gazelles, tigers and panthers. This masterpiece indicates the fine standard of the Arabic art of engraving. It was found by the Spanish in Cordoba and its history indicates that it was made in 968 A.D. European painters quoted the idea of ornamenting the ceilings of churches and palaces with colored paintings and they made it a start point as they developed that art more later on.

It was clear that Islamic art was based on ornaments and geometric shapes as a new expression of its actual spirit and inclination to mix material and matter, Muslims could transform plants into geometrical elements, and writings into plant ornamentation elements. They used complex calculations to reach that type of ornamentation called *Arabesque* in French and *Ataurique* in Spanish. Furthermore, Muslims knew what is now known as the abstract art, as it depends on plant ornamentation units like a flower, in

its abstract form, which gives a sensation of eternity. Muslim artists made use of mathematical operations in all their artistic works, examples of this can be observed in the mihrabs, and the minarets of mosques, which took utmost artistic care.

Moroccan art provided the best forms demonstrating the glorious Islamic outer and inner ornamentations as appeared in their colorful mosaics and the harmony of their magnificent models.

It is noted that the Muslim artist, to avoid imitating nature - which was considered indecent by some religious thinkers- resorted to draw legendary creatures and created many shapes through his fertile imagination like the horse with a human face, or the hawk with a human face. Muslim artisan produced metal pots in animal shapes, either for ritual ablution before praying, or fumigators for incense, on their surfaces were much ornamental paintings of Quaran and prayers.

In addition, Arabic calligraphy was also used as a decorative element. Muslim artists found in Arabic letters the basis of beautiful decorations for ornamenting buildings. They became interested in possessing its wonderful shapes to harmonize it with Arabic decorations. It was of many styles : the Kofi one used in holy texts and on currencies , beside mosques and tombstones. There was also the ordinary Naskh script which was used in copying books and in formal records. Researchers mentioned examples of Arabic writings admired by the Europeans for their ornamental arts, in spite of the apparent Islamic spirit, they transmitted them for decorating ceilings of palaces and churches without knowing their content.

As for architecture , *Abou Gaafar el-Mansour* built his capital Baghdad on river Tigris in a circular shape that was considered a new phenomenon in the art of Islamic architecture. In addition, there were also many cities constructed by the Abbasid people such as Samara with its mosques and great palaces. Europe adopted its architectural arts from Arabs and their influence was very clear in Spain and France. An example is in North France as a gate there was ornamented like *al-Fottouh* gate in Cairo. North Spain was the first region witnessing the Arabic impact on architectural traditions, mainly in the provinces of Lyon, Castile, and Galicia. In Catalonia, Islamic architecture imposed its effects on the

elements of Christian art producing a number of phenomena like double windows, balconies, towers, domes, ornaments and other multi-colored shapes.

In military architectural art, it is noted that the crusaders adopted from Arabs a number of the methods of fortification, and the making of intensification by imitating Islamic castles, which they saw during the wars with Muslims.

Arab artists were distinguished in many industries like pottery and porcelain making. There are still different kinds of porcelain left by Muslims in Spain and Portugal. Christians did not find any constraints in using the porcelain made by Arabic hands in ornamenting their churches and palaces.

Arabs were accustomed to decorate earthenware pots with some ornaments in Kofi writings or other kinds of plant ornaments. European museums still contain a number of pots made in some European countries after Andalusiain Arabic pots. Arabs achieved important advances in glass industry – a fact proved by their glass pots either painted with gold, or covered with enamel, that made Arabic glass very famous in Medieval Europe. Soon, Venetians became efficient in that art and transmitted it to other European centers.

Islamic metal works of art were the prime creations adopted by Europe. Among them were shapes of bronze or copper jugs used for pouring water and wine in churches. Those works of art were very popular in the royal courts of European kings and princes.

Carpet weaving art gained a vast fame in medieval Europe. As for fabrics, textile mills produced several kinds of embroidered textiles ornamented with gold and silver threads; both carpets and embroidered textiles were sought by European kings and princes, and were extensively marketed in European markets. Afterwards textile mills in Cecily imitated the silken Islamic fabrics which were produced by the Islamic textile mills in, then this craft spread to several European cities.

Among the most prominent examples of Arabic influence in textile was the phrase woven for the king of Sicily *Roger The Second* in 1134 A.D to wear it in the party of his coronation, on which was written in Arabic some Prayers for the king's glorification according to Islamic traditions.

Such a renaissance was coupled with strengthening paper industry as well as copying, correcting, and binding books which helped much in spreading Arabic thinking to different countries.

Oriental historians were convinced of Muslim architectural cleverness and appreciated their creations. They also acknowledged the influence of their inventions on the European renaissance and respected the Arab Muslim artists' genius in their artistic and decorative industries. Such industries produced - since the first Hegira century- a huge collection of ornamental pottery, glass, wood, ivory and artistic metal works of different kinds, colors and shapes. All of those products were decorated with Islamic ornaments that depicted the Islamic spirit, and represented the creative Arabic imagination.

Islamic art products were spreading, flourishing and circulating in the markets of Medieval Europe. They were often bought by kings, princes and wealthy people – a condition that aroused the jealousy of European artisans and urged them to imitate these industries. The most prominent example of that was the case of *Leonardo Davinci*, the renaissance eminent artist, who was eager to study Islamic decoration and included several samples of arabesque ornaments in his paintings. While Islamic art – that originally started in the mosque - motivated Muslims, made them feel the need for civilization, and formed their public and private life, it also embraced all people's daily needs. Examples of that include Cairo *hospial* that belongs to the 13th century A.D. It was built by *Sultan el-Nasser Qalawoun* in 1285 A.D and contained currents of flowing water like that found in the palaces of princes while music was played all day. In this hospital, all medical sciences were applied and all medical practices performed. Thus with fine arts and advanced medical sciences both present in this hospital, sick people were accommodated in the most easy and comfortable way.

There were also the palaces of princes built by artists with great talent, not only in the East but also in Morocco and Spain. The only one remained of them was the wrecks of *Zahraa'* of *the Omayad Abd el-Rahman El Nasser* in Cordoba, and the palace of *Minister el-Mansour* as well as the reception hall of lions in *al-Hamraa*. All these examples form another evidence of the great degree of development and, progress of Islamic art.

Moreover, Islamic arts added to the scientific artistic heritage unprecedented systems like the mosques, graves and schools. New disciplines were also introduced into houses, palaces, bathhouses, castles, and fences. New elements were invented by Islamic architects such as the new shapes of different constructions and forms - like that of crowns of the pillars - different from the ones existing in ancient buildings.

Architectural decorations flourished with distinguished technical, artistic production. The joint artistic relations between Arab Muslims and the Europeans had a great history since the 18^{th} century A.D full of ivory and metal articles, gems, porcelain and glass, pots, illustrated scripts, and several kinds of fabrics, and carpets.

Music

Music is among the fine arts in which the Arabs played a great role. They translated all that was available of Greeks, Babylonians, Persians, Assyrians, and Egyptians in that respect. They also, composed, and added several new melodies. They not only improved the available musical instruments, but they also added novel ones. For example, the lute was having four strings and they added a fifth one and so on.

Muslims influenced western music as well. In fact, the West was not acquainted with any sort of harmony in music in the middle ages, until Europeans exchanged relations with Islamic nations.

Arabic music flourished and its instruments developed, particularly in Baghdad that occupied the first place and the highest fame in this art. Among the most famous male and female singers in Abbasid age were the Bagdadi *Ibrahim el-Mousili* and his son *Ishhaq* and his scholar *Zaryab* who immigrated to Morocco and Andalusia spreading Eastern music whose influence still exist in the Andalusiain music. Senior Muslim scientists cleverly studied music theoretically and practically such as *el-Kindy, el-Farabi* and the Abbasid Caliph *al-Wathiq* .

Arabic music gradually moved from Baghdad, to other Muslim countries, including Andalusia. It flourished tremendously; European scholars who came to Cordoba for learning, were attracted to learn Arabic music as well. Christian governors of Castile and Aragon employed Arab musicians. Islamic compositions were translated into Latin language,

which led to transmit a large number of Arabic terms and musical names. as well as instruments, to European languages, they were used in their Arabic or a slightly altered forms. Among these names , we find the word (*lute*) (al-oud) which has entered all European languages as it is or with a simple change: it is *laud* in Spanish , *alaude* in portuguese , *luth* in French , *laute* in German,...etc. Moreover, the term *guitar* was quoted from the Arabic quithara , *trombate* from tabla , *adufe* is the duffe , *sonajas* are sonoj, *rubella* is rababa, *troubadour* comes from tarab dor (a round of chanting) ...etc.

The French orientalist *Gustave Lebon* stressed that dancing and music in Spain are still preserving the Arabic influence. He mentioned that: "*though the Arab influence in Spain had completely disappeared, however, some Spanish cities particularly Seville is still full of Arabic memories and its houses are still built according to the Islamic system. Dancing and music are still practiced in the Arabic way*". In addition, it is due to Arabic/Islamic civilization that Europe became civilized throughout six centuries. *El Trobadour* poets emphasized that, indicating that Arabs never ceased innovating musical instruments. They developed the *rubella* from the one cord Arabic instrument, and introduced basic improvements on the *lute* and the *canon*.

In brief, European musicians like *Mozart* and *Bach* were heavily indebted to Arabic music in their creations and the high standards they managed to reach.

Simultaneously, Arabs developed the art of versification and versified lyrics suitable to musical melodies. The art of singing on musical melodies in parties also progressed, especially in Baghdad and Andalusian palaces. The Arabic musical renaissance was also based on the use of precise measures that created musical timing. In addition, Europe knew the roaming musicians for the first time in Spain during the 10th century A.D, presenting their songs and dancing to show their heroism. Their songs and tales were derived from Andalusian Arabs, and *The Arabian Nights*. The popular songs of *El Trobadours* with their new verse meters were also quoted from Adalosian Muashahat and popular poems. Their main goal was to commend the beauty of nature, and show enthusiasm, as well as heroism. Some orientalists like *Dozy* and *Provencal* tried to draw a parallel between

European musical forms and their peers in Arabic heritage to prove the apparent Arabic influence. They proved that the word *trobadour* itself is an equivalent for the word *tarbdor* - as mentioned before-.

Arabs also preceded the West in composing voices and their harmony. In his book *Salvation* , *Ibn Sina (Avicenna)* - under the title "*The Best Melodies*" – described the principle of multi-voicing as one of the advantages, not bases, of melodies – a fact endorsed by the Europeans later on.

From the above, it is apparent that medieval Europe was influenced by Arabic/Islamic civilization in all aspects of life – a fact that confirms the importance of the interaction between civilizations. Islamic principles applied by some Caliphs and princes made Islamic civilization a universal, worldly one as based upon the efforts of scientists from all nations, religious men, scholars of geography and history spreading all over the world seeking knowledge and wisdom. Arabs also absorbed the cultures of the nations they opened while they were spreading their own civilization and religion at the same time util their culture became a permanent heritage and an immortal legacy.

Chapter Three

Arab Scientific Heritage and Its Impact on European Intellect

In the previous chapter, we summed up the significant role of Muslim scientists in constructing the world renaissance and linking the early ages' sciences and those of the modern ages.

Not only did Arabs transmit the Greek heritage, but they also added to it much of their own creations.

The books of many of Muslim/Arab scientists like *El-Kendy, Ibn el-Haytham, Ibn el-Nafeis, el-Bayrouni, Jaber Ibn Hayyan (Geber), el-Khawarezmy, Ibn Sina (Avicenna)*, and many others remained the accredited references in European universities util the 17th century A.D.

Convinced that the rational logical method was not sufficient to develop physical sciences, those scientists found it necessary to undertake experiments, and record observations. Hence, they adopted the proper scientific techniques that were followed later by the European renaissance scientists.

The following is a review of Arabs impact in the development of mathematics, astronomy , chemistry , physics , medicine and pharmacy.

Mathematics

Muslim/Arabs were so brilliant and efficient in the science of mathematics particularly that they combined Greek and Indian sciences, and added to them new distinguishing features of their own civilization. They transmitted that inheritance to Europe in a new shape through translation from Arabic into Latin in the 12 and 13th centuries. Arab/Muslim scientists developed mathematics, and added to it new materials much admired by the Europeans. Their additions included arithmetic, geometry, algebra, trigonometry, mechanics, and astronomy.

Abu Arrayhan al-Biruni (973 / 1048) took wide steps in the art of drawing geometric sketches. He also checked a number of arithmetic rules in his two books *Remaining Traces of Former Nations* and, *Investigating What Is Rational or Irrational in Indian Sayings*. Besides achieving great developments in mathematics and trigonometry, he managed to solve many geometric problems that became known with the name of Byrunic problems. In his book *Deducing Tendons in a Circle by Properties of Its Curved Line*; he explained how to obtain the angles opening with innovative geometric

and algebraic techniques. Europeans, therefore, were interested in publishing his books. The German scientist Edward Sakkhaw translated his book (the remaining traces) and described him in the introduction as "*a pride for humanity, and a man of civilization who respects science and scientists, and seeks scientific knowledge in every language*"

It is known that the Arabs adopted the Indian numerical system and used it to replace the sentence calculation -that was prevalent in the early ages- after they translated the famous Indian book in astronomy and mathematics in the reign of *Abi Gaafar El Mansour*. The book's name was *The Sindhind* ; it introduced Indian arithmetic sciences in the Arabic language, with its numbering system. Indians had many numerical shapes, The Arabs chose two series of the them, one known as (the Indian numbers) which is used in most Arabic countries and the other known as (the dusty numbers- as they were drawn by spread dust on a wooden board then drew digits on it) this is used in western Arab countries. They were prevalent in Arabic Andalusia and then were transmitted to Europe where they were known as Arabic numbers. The man credited for transmitting and using this Arabic numerical system is the Arabic scientist *Mohamed Ben Mousa el-Khawarizmy*, the first one to include them in his writings and books in arithmetic.

In addition, Arab/Muslims founded the decimal counting, put the sign of the decimal fraction and used the *zero*, using the zero revolutionized the science of mathematics

One of the merits of their numerical system is that it consisted only of 9 digits, and a zero; while the Greek digits were based on sentences counting and included a quantity of numbers equal to the alphabetical letters. The idea of the zero was the most important gift offered by Arab/Muslims to West Europe. *al-Ya'cobi* considered the zero the most serious digit known by the human mind in mathematics.

el-Khawarizmy explained also the means of using these new numbers including the zero in a research translated by the Europeans into Latin in the first quarter of the 12^{th} century. Therefore, the Europeans received the new numbering system, coupled with his name and therefore they called it *Algorithmi*.

El-Khawarizmy – who lived in the Abbasid era in the days of *Caliph el –Maa'moun*, was heading Beit El Hekma (house of wisdom) – and was the inventor of the algebra science and was the first one to use it as independent from of arithmetic. In his book *Algebra and Comparison*, he was also the first one to use the word (algebra) that entered European languages in its Arabic pronunciation. He could also blend Indian arithmetic and Greek geometry – an achievement that proved once more the benefits of the inter-civilizations dialogue, and their mutual interaction, resulting in constructive scientific creations, human development, and progress.

El-Khawarizmy composed his book on a request of Caliph El-Maa'moun, The book included profound information, that was a rich source for both, Arabic, and European scientists, who quoted, and added comments to many of its theories. It was translated to many European languages in 1831 A.D, as a reference for researchers. The book also affirms that the Arab/Muslims divided .the equations into 6 sections and put solutions for each one of them, using geometric methods. They also used symbols in the mathematical works, preceding European scientists like *Feta, Stephen, and Descartes*.

Their ability to combine both algebra and geometry in some works, initiated the science of analytic geometry, by which modern mathematics began in a detailed system in the 17th century. New branches soon emerged, like the science of integral and differential calculus prepared by both Arabs and Greeks. That science was then transmitted to Italy and Spain and other European countries.

El-Khawarizmy was followed by a number of Muslim scientists such as *Abou al-Wafaa al-Bozgany* and *Abou Bakr al-Karkhi* who founded special signs in algebra, using them in mathematical equations and thus preceding the Europeans by hundred years. The poet *Omar El Khayyam* also solved the quadratic and cubic equations using geometric models – a method deemed the best achievement of mathematicians in present time.

Regarding geometry, Arab mathematicians translated - in the era of *Abi Gaa'far el-Mansour* – the book *Euclid* from Greek into Arabic, naming it the book of *Origins*. They also applied geometric theories in practical life.

Al-Hassan Ibn el- Haytham (Alhazen) used geometry in his researches about light and wrote many books about his theories in

arithmetic, algebra, astronomy and trigonometry like *Explanation of Euclid Origins in* Geometry and *Numbers and The comprehensive in Origins of Arithmetic.* The Egyptian scientist Dr. *Ali Musharafa* lauds the man's precise thinking, deep research, and independent judgment, and asserts, "The *Arabs put trigonometry in a systematic, scientific form. They also combined algebra and geometry and applied geometry on logic, besides applying most sciences on different aspects of life.* " Trigonometry is, thus, an Arabic science founded by Arabic / Muslim scientists like *Nassir Eddin el-Tossi , Thabet Ibn Korra* and *el-Byruni .*

In conclusion, we can say that Arab/Muslim scientists took wide steps in the science of mathematics that paved the way for contemporary scientists to reach mathematical and physical laws. No one can deny their efforts in this particular respect, even after the lapse of 500 years. The translations of their books enabled European scientists to launch their researches and even to reach the moon.

Accordingly, it is justified that we must call now for the dialogue of civilizations and their interaction, as a must for their continuation, instead of their clash and disputes.

Astronomy

Muslims had many good reasons to be highly interested in the science of astronomy, and to know about the movement of the suns and the stars.

Settling in different places, and having to pray 5 times every day, Muslims had to define precisely the direction of al-Quibla (direction of al-Quaa'ba in Macca) towards which they pray, and to estimate the exact time of each prayer in different geographical locations, they were also interested in studying the twilight conditions to spot the crescent denoting the beginning of the month of Ramadan to begin a month of fasting, and to decide the time of their Lesser and Greater Bairams.

Accordingly, studying astronomy and astrological phenomena was their means to fulfill these compulsory religious requirements, and Muslim scientists were deeply interested in astronomy, emanated it from mythological trends, and fortune telling, and managed to reach many new and unprecedented methodologies never known before by Greeks, Persians or Indians.

Muslims' Interest in astronomy increased highly during the Omayad era due to the involvement of *Khalid Ibn Yazid Ibn Moawia* in it. At that time, a famous book in astronomy was translated from Greek named *Review of the Star key*. In addition, the Caliph *Abdul Malek Ibn Marwan* was interested in astronomy, and ordered the translation of other books.

Because of blending the Greek, Persian, and Indian civilization with the Arabic one – especially in the in Abbasid era– Arabs were interested in developing further this science. Caliph *Abu Ga'afar el-Mansour* ordered the translation of *The Great El Sind Hind*, the book that investigates the movements of the sun and the stars, and the related phenomena.

Succeeding Abbasid Caliphs like *El Mahdy* and *El Rasheed*, also encouraged studying this science.

Still, Arabs did not confine that science to theoretical aspect, but expanded it into meteorology, and practical applications. Consequently, they established observatories. The first astrological observatory was built in Damascus in the era of Omayads, and other two were built in the reign of the Abbasid caliph el-*Maa'moun*, one in Damascus and the other in Baghdad. Observatories then, spread in Islamic countries and were equipped with instruments and tools to follow up the movements of the sun, moon, and stars with great precision.

Arabs were the first to make a real measurement of the earth's circumference and estimating the distance between its diameter and its middle in a correct way that verified that earth has a round shape. They also knew the reasons of the sun eclipse, defined the length of the year and the seasons, discovered some kind of error in the moon movement, recorded the cycle of seasons, and estimated the length of the solar year with a very slight error of 2 minuets and 22 seconds.

Arab\ Muslim scientists were aware of the roundness of the earth and its movement around the sun, as well as the movement of the stars. In his book *The Pleasure Excursion of One Who is Eager to Traverse the Regions of the World*, *al- Sharif Abdullah el –Idrisi*, mentioned that the earth is as round as a ball. The *Mass'oudi* also mentioned in his *Meadows of Gold*, that when the sun sets in China; it is rising at the same time on Algeria, and vice versa. This shows clearly that Arabs preceded *Copernicus*

and *Galileo* in discovering the spherical shape of the earth, and the movements of stars, that was contrary to the views of the church, *Ptolemy*, and other European scientists who believed that the earth is the center of the universe , and to what European scientists believed of the rotation of the sun, stars, and the moon around the earth.

Al-Bairuni, due to his researches in the observations of the stars, and in astronomical tables, together with his other valuable compositions, was considered the father of the scientific renaissance in astronomy that was lead later by *Galileo* and *Copernicus*. He wrote a number of books highly appreciated by orientalists such as *The Mas'oudy Law in astronomy and Stars* – a great astronomical encyclopedia reviewing the whole world with its earth and the sky -, and *Understanding for the Pioneers of Astrological Industry, and flattening of the spheres., al-Bairuni* also studied the art of drawing astronomical charts and had an equation for calculating the hemisphere of the earth still used up until now. In the words of the Italian scientist *Nilleno*, "*the history of astronomy is not completed without al - Baironi".*

Among Muslim astronomers , there were many clever people as well. While *Mohamed al-Battan*y corrected some errors of *Ptolemy, Ibn Yunis el- Masry*, in the late 10th century, made researches in the eclipse of the sun and the moon.

Al-Ferghani's book *Principles of Astronomy* had a great effect in scientific development. The translation to Latin of *al-Batruhi*'s book *Astronomy,* was of a great effect in the development the astronomical knowledge of *Copernicus*.

To sum up, we can say that the Arabs went deep in studying astronomy and purified it from many myths that were related to it. They brought it back to the scientific form left by the Greek, keldanian, Persian, and Assyrian scientists; an inductive science based on observations and calculations. They excelled in making instruments, and observing the celestial objects with their creative, precise methods, and thus rendering precious services to humanity. Their researches and concepts highly assisted to establish the European renaissance and modern sciences later on.

There are still hundreds of Arabic names in European astronomical encyclopedias e.g.: Caph, Arnab, Arkab, Saif, Sud Sadal, Tauri, denob

Chemistry

Chemistry originated in ancient Egypt, expired with the Greeks and Romans, and was reborn once again by the Arabs, who founded its scientific bases. There was a consensus that *Khalid Ibn Yazid Ibn Mu'awiya* was the first one interested in it. By ordering the translation of Greek heritage of chemistry into Arabic, *Khalid Ibn Yazid Ibn Mu'awiya* presented the roots of this science, to Arab/Muslim scientists for further study and research. Khalid Ibn Yazid himself was the first to make use of this heritage, as he wrote some books in chemistry like (Al Serr el Badi' fy fak el ramz el manie') (The magnificent secret of how to solve the difficult code) also (al-Ferdaous) (The Paradise) and some other messages.

Due to the efforts of some Muslim scientists, chemistry became a real science, because they introduced objective experimentation in studying it, Europeans made much use of these Arabic efforts. In other words, chemistry, in its scientific form, was a great achievement of Arab/Muslims, They introduced precise observations, and scientific experiments, and were keen to register the results; they also analyzed many materials chemically, differentiated between acids and alkalis, and discovered the relation between them, and studied and described hundreds of drugs. One of their most important discoveries was finding the relation between chemistry and medicine; they were the first to apply chemistry in medicine and gave it the name *Alchemy* that became chemistry in English.

The name of Kufi scientist *Jaber Ibn Hayyan (Geber)* occupies a remarkable position among chemists, as a genius, he is a pride to the orient, who demonstrated the importance of experimentation, and put it as a condition for any real science, he advised scientists to make precise observations, be always cautious and, avoid rushing . He wrote about 500 books in chemistry that were studied in Europe for centuries, and are still appreciated in our present days.

Jaber Ibn Hayyan (Geber) is considered the father of chemistry; he was the first to prepare acids, and to prescribe several chemical processes like distillation and dissolution. He was also, the first chemist who prepared the sulfuric acid, discovered the nitric acid, and gold water; for all this Europeans estimated him highly, and translated his books to the Latin language. His book *the chemical compounds* was one of the first Arabic

books translated in the beginning of the twelfth century; most Europeans who studied the science of chemistry in the middle ages were his scholars.

He benefited the Europeans by acquainting them with some poisons, ammonia salt, potassium, and gold water. *Ibn Khaldoun* gave him much credit, and described him as the chief (imam) of chemists.

People in recognition of *Jaber Ibn Hayyan (Geber)* and his relation to chemistry, gratefully gave it the name "*Gaber's science*".

The first cause of reaching *Jaber Ibn Hayyan (Geber)* the great results he achieved, was that he was committed to the solid scientific rules of experimental school in science, and by this, could make valuable additions to the human scientific treasure. That made his name one the first immortal names in the history of human intellect.

Jaber Ibn Hayyan (Geber) wrote in many subjects, but his most important books were *The Sun Book, The Moon Book, Book of formulas, book of secrets, book of poisons and drugs, and the book of clarification.* In the later book, he mentioned, the composition of metals, and the making of gold, he has many other books.

Examples of the many inventions related to him are:

- Using manganese dioxide in glass industry
- Preparing an anti-rust sort of paint for iron
- Using alum in fixing dying materials
- Manufacturing a sort paper that can not be burnt
- Refining metals, preparing steel, and tanning leather.
- Distillation of vinegar to produce concentrated acetic acid

In brief, the efforts of *Jaber Ibn Hayyan (Geber)* granted him a high rank that makes him match the contemporary modern scientists.

Abu Bakr al-Razi *(Rhazes)* The famous physician and philosopher, was one of *Ibn Hayyan*'s students. He liberated chemistry from myths; his method in thinking was a clear one. He was inclined to study chemistry because of its close relation to medicine, and managed to prepare medicaments, and drugs. He composed numerous books, many of which were lost; but his book *the secret of secrets (serr el assrar)* gained a great fame in Europe and was translated into German. Studying his books deeply revealed that, he was one of the greatest knowledge seekers ever lived before the emergence of a new dawn of science in Europe with *Galelio*. He

was distinguished with his spirit of investigation, and scientific curiosity. To summarize, his theory in material, he said that there are five absolute elements, which are the creator, the spirit, the body, the space and the time. He made it clear that, bodies are composed of, an undividable element, surrounded by empty space; he, also said that elements are characterized by having a fixed volume, and that elements are four, dust, water, air, and fire. The characteristics of these four elements are lightness, heaviness, transparency, color, softness, and hardness; these characteristics can be measured by the density of metals which is the vacuum separating the atoms.

In his book (secret of secrets), he explained his experiences and the essence of his researches; he began by pointing out what materials he worked on, then what tools and instruments did he use, and the methodology he adopted in preparing the compound. Therefore, he was interested in scientific chemistry preferring it to theoretical contemplation. By all this, he created a revolution in chemistry.

What *characterized al-Razi (Rhazes)* of systemic thinking and tidy knowledge made him the first organized planner in classifying the materials used by chemists of that era, depending on the natural characteristics of materials, and was able - in most times - to differentiate between metal and non-metal elements.

Al-Razi (Rhazes), was considered without the least doubt the founder of two sciences : curative chemistry, and drugs. *al-Razi (Rhazes)* was the first also to describe the processes of preparing sulphuric acid and called it zag oil; He also prepared alcohol by distilling fermented sugary or starchy materials and used it in pharmaceuticals.

Europeans adopted his idea of classifying the chemical materials to metal, animal, and plant categories, such a classification had the greatest effect in the development of the modern science of chemistry.

Ibn Sina (Avicenna) was the unparalleled genius of his era. He was not only fond of knowledge, but he lived it as well, he spent all his time seeking knowledge. He agreed with *Ibn el-Hayytham* in his theory of the composition of elements. In his book (al qanoun) *The Law of Medicine*, he referred to a large number of chemical operations such as distillation, sublimation, infiltration, extraction, and waxing, he used different

apparatuses to achieve his results. In his book (al-Shefa) *Recovery*, which is considered a principal chemical source, he mentioned a number of chemical compounds of a botanic or animal origin.

Al-Magriti was another name among the 10th century A.D scientists. He had a book in chemistry that was translated into Latin as a major source in the history of science.

Other names can be mentioned in the same field like *Ibn el -Beitar, Ibn Maymoun*, *Ibn el-Nafis*, *Daowoud al-Entakky, Az-Zahrawi(albucasis),* and many others.

To sum up, Arab scientists made great developments in chemistry that enabled them to apply conclusions they reached, on different industries (what is now known as industrial chemistry) they used their expertise in dying of fabrics, leather tanning, metal industries, and composing perfumes. Arab chemists also discovered gunpowder that made a revolution in military arts and weaponry, also in projects like making roads and breaking rocks. They, preceded Europe in resorting to experiments to prove theories, and were the first to extract and/or prepare many of the acids, and compounds on which the modern industry still depends. They prepared compounds, still used nowadays to make soap, paper, silk, explosives, dyes, and industrial fertilizers. Their impact can be proved by the large number of Arabic words included as chemical terms in European languages. Without Arab/Muslim contributions, the science of chemistry could never achieve its ends – a fact stressed by the orientalist *Guatave Lebon*.

Physics

Arab/Muslims were very superior in the field of physics, mainly in the field of lenses, optics, sound, magnetism and gravity. Most of their researches were translated into Latin. They called the science of light (the optics) or the science of scenes.

El-Kendy composed two books on this science : *Difference of Views* and *Difference of Mirror' Views*.

Ibn Sina (Avicenna) also worked in this field and had new theories which he mentioned in his book (*Recovery*).

Al-Hassan Ibn al-Haytham (Alhazen) (965 – 1020) was the most prominent specialist in this science. He was the most genius scientist of

physics in the middle ages, and the one whose name remains connected to the science of optics and lenses.

Ibn al-Haytham (Alhazen) made the first significant contributions to optical theory since the time of the Alexandrian astronomer Ptolemy in the 2nd century. His books remained the first references in the science of light until the 17^{th} century A.D. In his famous book *scenes*, he proved that both angles of falling and reflection of light are in the same level. The book was translated five times into Latin and spread all over Europe in the middle ages. It consists of seven volumes dealing with the science of optics including the anatomy of the eye, the name and function of each of its parts, and how can we see by both eyes at the same time, also how the rays pass from the seen object to the eye, hence its falling on the eye retina. Then there was a research on lenses and light theories. Roger Bacon and most writers of the middle ages depended mainly on this book. In his book On the *Burning Glass*, he revolutionized the nature of focusing, magnifying, and inversion of the image.

Ibn al-Haytham (Alhazen) also wrote a number of other books and articles on the same topics. He finally managed to prove the error of Ptolemy's theory in stating that the ratio between the two angles of falling and refraction is fixed, and indicated that it is changing.

His experiments included moonlight, stars' light, and investigations of bright and dim lights, this put him in line with modern scientists like Calvin, as he grasped knowledge of theoretical, experimental, and applied physics.

Ibn al-Haytham (Alhazen) was the founder of the science of modern optics, that was based on replacing the old theory of vision - which stated that vision takes place due to emission of rays of light from the eye to fall on the seen object - by his new theory, stating that vision takes place when rays of light are emitted from the seen object to fall on the eye and to reach its retina, from the retina the effect reaches the brain via the optic nerve, and by this the object will be seen.

He was the first to say that the convex lens magnifies the images. His researches in magnifying lenses paved the way for using them in correcting the defects in eye vision later on. He was also the first to describe the parts of the eye, and giving them their names that we still use nowadays, like retina, cornea, vitreous body...etc.

Dr. *Moustafa Nazif* confirmed that most researches and light discoveries have been included in Ibn al-Haytham (Alhazen)'s books .

Abou Arrayhan al-Bayruni was also distinguished with his scientific creations in the field of physics. He concluded that light is faster than sound, and that objects that produce sounds will cause a movement that affects air to move inside the objects it passes through. He also investigated hydraulic laws controlling springs and wells' waters. Furthermore, he made studies in defining specific density of eighteen precious stones, and formulating the law of specific density, it is worth mentioning that the specific densities estimated by al-Bayruni are about the same as what we know now, after using sophisticated scientific measuring tools.

Abu Bakr al-Razi (Rhazes) Was concerned with calculating the density of bodies, using a special scale which he called the physical scale.

The Arab scientist **al-Khazin El Basry (965 – 1038)** invented a special tool for knowing the specific gravity of any liquid. In his book *The Scale of Wisdom*, he discussed the phenomenon of air pressure, stating that air -like liquids- has also a lifting power; which means that air can carry objects. He also stated that the weight of an object immersed in water is lesser than its real weight, and made researches in gravity, and the relation between the speed of a falling object and the distance from which it falls, which means that he was aware of the concept of gravity before the formulation of its law by *Newton* .

In addition, Arabs had valuable researches on levers, they actually used several types of levers which al-Khawarezmy mentioned in his book (keys of sciences). They also wrote about sound; their scientists showed that sound is transmitted through air, which led them to make researches in musical sounds and the making of musical instruments, classifying the grades of sound, knowing the relation between the length and degree of tension of the string of the musical instrument and the quality of the sound it produces. They explained why echo happens, and why lightning is seen before the sound in thunders.

Because of all theses efforts, the Europeans translated books of Arab scientists to their European languages. An example of this was the translation of the books of al-Khazen el-Basry to Latin, then to Italic since an early date, European scientists benefited of them, an example is *Robert*

Gnosseteste (1175 – 1253) who was considered the most eminent among western European scientists in the 13th century A.D., He did benefit of al-Khazen el-Basry books, another examples are Witolo Paul, and Roger Bacon, who by his turn, benefited from *Gnosseteste*, and Witolo.

Thus, the ideas of the Arab/Muslim scientists, helped the birth of European age of renaissance, and the emergence of several genius European scientists. As is the example of Newton's making use of the ideas of Ibn Sina, and al-Bayruni in discovering the laws of gravity; and Kippler making use of the book of Ibn al-Haytham in optics, and so on.

Orientalist, Briffault said that modern physics is indebted to the Arabs not only for their scientific discoveries and new theories, but also to the Arabic culture for its existence, because modern physics emerged in Europe as a result of the scientific spirit introduced by Arab scientists into European civilization.

Medicine

Between the 8th and 15th centuries A.D, There was no worthy medical science in the civilized world except the Arabic one, Arabs' medical superiority in medicine from scientific, organizational, and practical aspects, is an undoubted fact.

Arab civilization had its own medical sciences even before they were acquainted to the Greek civilization, they had their own procedures and methodologies, the number of Arab physicians was so great as Ibn Aby Osaybea'a mentioned in his huge volume (degrees of physicians)

Indeed Muslims absorbed books of medical Greek scientists like Gallen, added to them, and wrote new chapters in medicine and pharmacy depending on their special observations and experiments; they even corrected the faults of the Greeks as is apparent al-Razi's book *al Fesoul* , where he warned of errors made by *Hippocrates* and *Gallen*. His opinions highly conform to the modern science of medicine. Other Arab physicians reviewed the two European scientists' medical comments to affirm the correct ones, and abandon the wrong ones. They also built hospitals, known as Maristans since the Omayad age. The first one in Islam was built by the Caliph *al-Walid Ibn Abd el-Malek*.

In the Abbasid age, Islamic medicine witnessed a huge progress due to Caliphs' interest in medicine. While *al-Mansour* was close to and generous with physicians, *al-Rashid* established a large maristan in Baghdad for medical education of students, and treatment of patients. These hospitals were built in the best and most suitable locations; they preceded in their systems the university hospitals of today. A large number of medical schools were built in the Abbasid age. They received scholars from everywhere to learn Arabic/Muslim discoveries and inventions in the medical field.

By contrast, the Europeans lacked sufficient medical information, because the clergy considered ailments as a sort of divine punishment for men, hence it was taboo to try to cure sick people. The church also banned the anatomy of the human body; their physicians were obsessed with superstitions. Such a gap between the medical level of Arabs and that of Europeans was clear in the tales narrated by the historians of the crusades. In Europe, for example, insane people were hit to rid them of the devils inside their bodies. Europeans referred urgent cases referred to Arab physicians, seeking their superior talents. Some European princes had Arabic physicians instead of their inefficient physicians.

As a result of Arab scientists' superiority in the medical sciences, Europeans were eager to translate and publish their writings in their languages.

Al-Razi – the most famous Muslim doctor – who was called by Europeans "the Arabs *Gallin*" composed a wealth of books about fever and pediatrics, which were considered among the basic references on which physicians of West Europe relied for a long period.

In general, his books were distinguished with his vast knowledge in the science of anatomy. He applied new techniques in treatment based upon his knowledge of chemistry and pharmacology achieving great success; these techniques are still applicable by modern physicians.

One *al-Razi*'s most famous books, was *al-Hawy* (the container) which was considered the greatest medical book dealing with medical profession, it includes 24 parts containing all that he collected from different medical books and referring everything to its original creator. He dealt with subjects of anatomy, drugs, surgery, and diseases. This book was translated

to Latin language in 1279 by Farag Ibn Salem for *Charl Ango*. It was discovered that the book was reprinted more than once and used in European universities till the 19th century.

al-Razi wrote other books in spiritual medicine, joints diseases, gout and sciatica. Aside from his cleverness in diagnosing fever and prescribing medicine, he discovered alcohol and sulfuric acid.

European translations of Arab/Muslim medical references extended to include those of the scholars following ***al-Razi***.

Ibn Sina (Avicenna), was called by his contemporaries the boss sheikh, or the second teacher after the first one *Aristotle*. He was a physician, a philosopher, and a scientist likewise. His books like *Recovery*, *The Law of Medicine* and *Medical Remedies* were the main references of all medical schools in Europe, and therefore were translated into Latin for many times to be studied as basic texts in all European universities. Besides, he was also famous for his psychological treatment and the first one to use hypodermic injection as well as anesthetization for performing surgeries.

One of the interesting stories told about how Ibn Sina could practice psychological treatment was about a young man who physicians failed to treat, after trying hard to do. Ibn sina summoned a man who knows every district in the city, and asked him -while the young man was attending- about the districts one by one. Ibn Sina was watching the young man's face closely, and feeling his pulse; On mentioning a certain district the pulse of the man became faster, then on enumerating the houses of the district one by one, on mentioning a certain house the boy's pulse became more fast. Ibn Sina then concluded that the young man was in love with a girl in this particular house, his prescription was advising his parents to wed their son to the girl.

In surgery, Europe asked the help of a number of Andalusiain physicians. One of the most most prominent of them was Az-zahrawi (Albucasis) , the senior Muslim surgeon.

Az-zahrawi (Albucasis) was the first to prescribe the operation of crushing stones in the urinary bladder, conduct research in joint inflammations and tuberculosis, use female nurses and recommend their assistance in operations, particularly for women to comfort them. In addition , he had several compositions in medical profession, His 30 -part

medical encyclopedia, *At-Tasrif ("The Method")* contained over 200 surgical medical instruments he personally designed, and was a surgical treatise that had a tremendous influence on Western medicine.

At-Tasrif ("The Method") was Translated into Latin in the12 th century by the Italian scholar Gerard of Cremona, at-Tasrif stood for nearly 500 years as the leading textbook on surgery in Europe, preferred for its concise lucidity even to the great works of the classical Greek medical authority Galen of Pergamum.

Last and not least, Muslims introduced new medical methods. They used anesthetic drugs extracted form poppy plants in operations, opium in treating nervous diseases, and cold ice packs for treating fever and stopping bleeding. They also discovered and treated leprosy as well as tuberculosis and paralysis.

In addition, they resorted to psychological treatment in treating some organic diseases, performed operations of removing cataract from the eyes, identified the blood circulation and put the first description of it. Moreover, they invented new instruments in surgery, drafted sketches for them and used the strings taken from the intestines of cats and other animals in stitching wounds.

Besides, they discovered the benefits of adding lemon juice, oranges and carnation to medicines to improve their bitter taste.

Therefore, Muslim scientists' books in medicine remained as references for European researchers for six centuries.

In brief , we can sum up some of their achievements in the following points :

1) Arab/Muslims transmitted Greek medicine in a new form carrying their own stamp and spirit.
2) They developed anatomy and pharmacology, particularly after the discovery and explanation of *Ibn el-Nafeis* of the minor blood circulation.
3) They invented the science of differential diagnosis. *al-Razi* is credited for initiating such a science with his investigations and interpretations of signs, and distinctions between different diseases.
4) Europeans benefited from Arabic medicine as a profound scientific subject related to clinical medicine. They quoted their knowledge of

drugs and remedies and their experience in surgery. They also adopted the system of their hospitals .

Europeans benefited of Arabic medicine in adopting:

- Text books dealing with all branches of medicine, the most important of which was an encyclopedia by the name of al-Qanun fi at-Tibb ("The Canon of Medicine"), the most famous single book in the history of medicine in both East and West.
- Extensive scientific materials about clinical medicine after al-Razi
- Scientific knowledge about drugs and pharmaceuticals, after Ibn el-Bitar
- Experience in surgery, after Az-zahrawi
- Hospitals and hospital systems

We can see apparently how an inter-civilization dialogue in medicine was more beneficial for the humanity than conflicts and wars.

Pharmacy (Pharmacology)

Arabs outstanding knowledge in chemistry was one of the reasons of their efficiency in pharmacy. They added to known remedies several compositions they invented. Their books in drugs benefited the Europeans largely.

Importation of Arabic drugs was an essential component of the Italian trade with Arabic east, In that sense, Venice flourished as a commercial port for selling expensive drugs from the Arab East.

In fact, Arabs were the founders of the science of pharmacology. They knew much of it, and used their knowledge in the treatment of diseases.

Ibn el-Bitar (1197 – 1248) In his book, *Compiler of Remedies and Food Items,* he gathered a collection of medicaments extracted from plants like rhubarb, tamarinds, nutmeg, camphor, and alcohol. Also paints like rose paint, daffodil paint, and elderberry paint. He was caring to describe the substances of drugs, their characteristics, and use.

Ibn Rushd (Avirroes*)*, mentioned the medicines necessary for treating diseases in the forms of herbs, or liquids.

El-Idrisi, composed a book about the characteristics of plants, in this book he mentioned the names of medical plants unknown to others before, like zaatar, castor, ginger, colocynth, khella, and wormwood. He

also mentioned alcohol, emulsions, plasters, arsenic, poisons, and others. **Dawoud al-Antaky** In his books, was also interested in the description of medical plants, especially pomegranate.

Ibn El Nafeis had a technique in treatment mainly that depended on using food more than drugs, as is apparent In his books, *Law of Pharmacy*, and *Recovery*.

Ibn Sina (Avicenna) described medical plants from which drugs are extracted, the way of using them for treatment. He described the way plant absorbs its nourishment, and how the juices infiltrate to its different parts. He also wrote many chapters in botanic and zoological studies. Such valuable researches accounted for the need to translate his book for fifteen times and using it as a reference in European universities up to the 17^{th} century.

Furthermore, Arab/Muslims were the first to establish drugs stores, and establish a school of pharmacy.

In their treatments, Arab physicians not only prescribed medicines but also food in its different kinds and forms, indicating the benefits and harms of each of them.

Al-Razi, demonstrated in his book, *Benefiting of Foods and Avoiding Their Dangers*, demonstrated this point in details. **Ibn Sina (Avicenna***)* advised taking the proper amount of food , no less , no more.

Europeans adopted from Arab/Muslim pharmacists their diagnosis of diseases, prescriptions of medicines, and their knowledge of drugs.

Ibn el-Bitar's book was their major reference in this respect until the latest 18^{th} century.

One of the major contributions of the Arabs was establishing schools for preparing medicines. These schools were under the control of the state, and the observation of scientists. To prevent any illegal activities. Pharmacists were requested to have an official license to be able to practice.

Arabs combined pharmacy with medicine; they established a pharmacy in every hospital or (bimaristan).

Arab/Muslim pharmacists also discovered many drugs and composed a number of beverages, emulsions, and different medical extracts – quoted by Europeans, and some are still preserving their Arabic names.

So, Arabic/Muslim scientists played a key and honorable role in serving human civilization. They transmitted the Greek scientific heritage coupled with their precious additions to Europe, and thus sharing in developing modern civilization. They also managed to build close relations with other world civilizations. They laid the bases of scientific research in its modern sense in all fields of knowledge.

Arab/Muslim civilization was embraced by the Europeans who acknowledged its superiority and excellence. It was them who civilized Europe intellectually and morally _ a fact confirmed by many orientalists like *Lebon* who Descriped them as the *professors of Christians* .

The West is indebted to Arabic/Islamic civilization for rescuing it from the darkness of the middle ages. Similarly, the Arab/Islamic world is now indebted to the West for the knowledge and sciences transmitted to it in the modern times. Arabs and Muslims now need to carry out discussions with the West and benefit from its modern civilization and developed potentialities.

Chapter Four

Is The Meeting Of Civilizations a Dialogue or a Conflict?

Throughout the whole history, it was difficult to find a nation, or people who belong to only one race, or religion. Racial or religious purity is difficult among humans.

Man, is a social being that cannot live alone, because his numerous needs motivate him to mix with others surrounding him to exchange mutual benefits. The more his relations with others expand, the more secure he feels. However, such safety of human individuals can be threatened with feelings of love or hatred, or when racial, religious, or belief conflicts take place.

Human nature is an ambitious one, always seeking development and advance, this goes in an endless chain. Reaching a higher step of development, is an incentive that urges humans to work for a new and higher one.

In other words, continuous human efforts to reach new dimensions beneficial to humanity are by additions to civilization, also In co-operating other peoples within any civilization is an addition to it, and a means to spread it to the rest of mankind.

In that sense, human history never witnessed the so called unmixed civilization, but rather an interchange of human cultural heritage in all its literary, scientific, philosophical and artistic aspects.

Accordingly, the call for accepting the other is benefitial for all societies. In tracing back the roots of human civilizations, we shall find that Arabic /Islamic civilization was one of the most important, this same civilization benefited from other civilizations like ancient Egyptian, Indian, Chinese, and the Greco-Roman.

Many writings in Europe claim that Arabs were a mere only mimicking the Greek civilization with no basic civilization of their own, and that their present civilization, is itself a mirror image of that of the West. This point of view is indicating that it is obligatory for Arabs, and peoples of the orient to conform to Western life style, if ever they want to be civilized.

Though we accept the fact that Greek culture deeply affected the European renaissance during the middle ages, we still object to the idea that Greek intellect liberated Europe from the dark ages to achieve its major

renaissance. Conforming with the views of fair European historians, we can state that the European current cultural awareness current, was distanced from the Greek heritage, while very close to Arabic cultural sources, the sources that preserved Greek sciences, and developed them more, starting with the 12^{th} century, whereupon, indications appeared in Europe, of a scientific, literary renaissance, with new characteristics, representing a blend of several previous civilizations , particularly the Arabic/Islamic one.

Regarding the allegations that our literature, science, language, traditions, way of life, and religion do not suit modern life and that we have to change to cope with the western life style, they are wrong. The truth is that Arab/Islamic civilization enlightened Europe during the dark middle ages and laid the bases and rules of modern civilization on which it built its renaissance.

This fact was assured by the orientalist *Nicholson* on saying that: "*Arabic scientific works in the middle ages were distinguished with precision and profound knowledge. Modern science derived its elements from them.* " . The orientalist *Gustave Lebon* also repeated many times that Europe is indebted to the Arabs for its civilization, and without them; the West would have remained in darkness.

We can finally say that people should assist each other to maintain civilizations and serve humanity at large regardless of origin, religion, race or color.

The mission of Islam was a global one, for the entire world integrating all the preceding holy messages that all aimed to orient man to goodness. Islam also respected all the prophets mentioned in the Quran as the branches of one tree, and they all aimed to reach the same goals: achieving love, peace, mercy, tolerance, among people, and call for a dialogue that enables people to be closer to each other, and able to exchange different viewpoints.

Accepting the other is a very human and civilized idea, if not spoiled by the desire for domination and authoritativeness. It can be the way to reach a dialogue, which gradually turns into mutual understanding of the other, and recognizing his culture, and religion.

Such an attitude must to be adopted by the West, to acquire new ideals that can resolve the current civilization crisis, augmented by the collapse of ideologies, the end of the Cold War, and the fall of the two poles world system. It has to stop looking for an enemy and liquidating the other to spread a global, world system and replace this with the concept of conducting an actual dialogue between civilizations to achieve human welfare.

A true dialogue with the U.S.A and Europe is necessary to clarify all binding matters, and concentrate on the different concepts of terrorism along with the Arab/Muslim attitude that opposes violence. This will help to overcome the crises and the unsettled international circumstances, and to find opportunities for the meeting and interaction of civilizations, as well as continuing the mission of man on earth.

International understanding became, therefore, so necessary for all nations and peoples as a means to face problems. A common dialogue language among different cultures should exist, to be able to contain the morals of that dialogue, and its values.

Fukuyama - a Japanese American - was provoked by Western quest for a new enemy, and by the fragile social relations between people in Western communities, he wrote a book that gained a vast reputation.

In his book, *End of History, and the last man*, Fukuyama instigated thinkers of the world - with their different trends -, to hold cultural discussions on the world future, having in mind the advances in information technology, and the absolute superiority of Western civilization over any other existing ideologies and civilizations. His second book *The Great Choice*, recorded the shift to the first twentieth century with stress on human nature, rebuilding social systems, and emphasizing the great collapse of relations in progressed communities due to the information revolution. It aimed to reshape the social system, and reform the prevalent collapse of social and domestic relations.

Because of all that, the issue of civilizations' clash began to be more pressing, causing tension, and complications, particularly after *Samuel Huntington* - professor of politics in Harvard University - discussed the subject. He prepared a study on *"The Changing Security Environment and American Interest"* under the title of *The Clash of Civilizations*.

In his study, Huntington discussed the coming conflict after the fall of communism, the collapse of the polar duality, and the disappearance of ideological conflicts between the capitalist West and the Soviet Union. He indicated that civilizations' conflict would substitute the ideological clashes and other former forms of conflict. The research was published in the summer of 1993 in the most famous magazine for researches of foreign policy, which resulted in serious repercussions because he openly indicated that *Islam has become the major enemy of the West*. He expected a clash between them and attempted to put Islam in the position occupied before by the Soviet Union. Thus, he considers Muslims the new enemies of the Western world, due to some social, and economic differences, beside the incidence of some violent actions in Islamic world regions. Meanwhile, he indicated the necessity of the domination of Western civilization over other ones. His theory can be proved to be wrong in a very simple way, because it is built on a false concept of Islam, and other religions. He is ignorant of the plain obvious fact that Islam is a religion that calls for peace, and advocates for good, and continuous relations and dialogue among peoples, and nations and completely rejects disputes. In that sense, Islam is an important, and effective partner of globalization and in strong touch with different world countries.

It is noted that after the events of 11th of September in New York and Washington, the American society became aware of its points of weakness and therefore reacted in a nervous, confused way. The concept that Islam is the new enemy has become stronger, particularly after asserting that most of the persons involved in the attacks, were Muslims, or using Islam as a disguise to camouflage their intentions.

Some deliberately tried to draw a false image of Islam that completely differs from its true nature. Islam is distinguished with calling for kindness, tolerance, and deep understanding of the human soul with its motives and inclinations. Cries of agitation, and anger inciting for violence against all Muslims, became as incredible as considering every Muslim a terrorist, or at least a potential terrorist.

The most famous biased and ridiculous sound came from an Italian journalist, the so called *Oriana Falatchi*. Her book *Pride and Anger* is full of hatred, she attacks Islam in a prejudiced, disgraceful manner and calls for

a religious war against Muslims. Though an atheist herself, she uses religion to stir the public. She also denounces the sympathy of the Vatican with the Palestinians as a kind of support for Islam, the source of terrorism in her ill-opinion.

In that way, Islam enemies attempted to relate the phenomenon of terrorism with Islam, while the fact is that the essence and nature of Islam contradict completely all sorts of terrorism.

It is therefore necessary to break this ugly artificial bond between Islam and terrorism, and to emphasize the facts that Islam recognizes all holy religions and respects all prophets, and that Quran assures in many verses that religion should never be a cause of conflict. Still, it is wrong to combine terrorism and religions because they all religions are against killing and frightening peaceful people. Thus, terrorist actions are always inconsistent with any religion, logic, legislation or ration.

In order to settle matters, there are indeed, a number of problems facing the Arab world which are in need of a fair and just solution, particularly the Palestinian issue.

Terrorism should not be confused with legitimate struggle for liberation. The ongoing conflict between Islam and the West triggered the rising of fundamentalist movements, and call for hating the West; on the other side, there in the west are screams calling for the hatred of Islam. This conflict is of no benefit to either party. Both sides must co-exist and converse to create the suitable cultural atmosphere for accepting the other.

The world must move to face the hazard of what is called the conflict of civilizations, through spreading the culture of accepting the other, to build a better life for all, based on mutual recognition, appreciation, and co-operations among civilizations instead of their clash.

Understanding the motives of human societies, approaching all problems, primarily the Palestinian case , integrating civilizations for facing clashes among them and using all religions to spread tolerance, and mercy, and combat evil, can all help to achieve the same lofty goal.

There is an urgent need to activate civilizations' dialogue for the following reasons:

1) Eliminating the reason used by major forces like the *U.S.A* to rush to wars, or attacks under the pretext of fighting terrorism, especially after

the events of 11th September. War in our present days will be threatening with the annihilation of human civilization.

2) Clarifying the real image of Islam and the East, and correcting the wrong ideas about them, and face the biased propaganda against Islam and Muslims.
3) Approaching all civilizations with no particular focus on the *U.S.A* and Europe and attempting to find common concepts representing bridges to link Islam and the West.
4) Endeavoring to prove that no separate civilization can claim full responsibility towards the whole humanity, and absolute right to manage the world, especially that modern civilization is a collective one, established by the contributions of all human peoples.
5) Discussing the concept of globalization and the extent of its relation with the meetings of civilizations, the continuation of cultures and interaction with others, to prove that difference of civilizations must not be a source of panic, but of mutual exchange.

To sum up, the world now urgently needs a reasonable dialogue. Arabs and Muslims should participate in the modern civilizations' dialogue to reach new cultural concepts derived from national heritages, and coping with different cultures, with their positive orientations towards social and economic justice as well as political justice based on the right of self-determination. Certainly, what happened in Sept.2001 imposes upon us a degree of awareness and reconsideration of what we achieved so far, as some of our thinking about the future needs to be re-evaluated. New techniques in relations between states must be put in consideration; some of them concern prevalent cultural trends and the possibility of drafting a future cultural strategy, while others are concerned with the mechanisms of cultural work, beside the challenges they are facing after the latest events and means of suppressing them.

A balance between religious and worldly thinking should be attained, in order to have a new vision of the world away from radicalism and extremism.

We must also give great attention to our deeply - rooted Egyptian identity in a way that does not contradict in the least with our Arab and

Islamic national affiliation, also with causing no contradiction with the outer world as well. Such an attitude suits Egypt's unique location as the intersection of civilizations and cultures, and having a civilization able to assimilate, and to conduct a dialogue.

September events demonstrated the lack of inter- civilizations dialogue, and the pre-dominance of political concepts over that of civilization. It is, therefore, inevitable to know the fundamentals and origins of civilizations and co-operate to reconsider universal issues from a humanitarian perspective.

As U.S.A has finally realized the importance of having a dialogue with many peoples, the Islamic world must move to present itself, and change the form of this conflict from a political to a cultural one. Muslims also have to introduce themselves to the other parties in the proper form of Islamic religion that managed to establish a glorious civilization, which had positive interactions with all world civilizations and became an integral part of human civilization.

Aside from discussing the past, we should also look forward to what we can offer to humanity in the future. The coming stage is, thus, serious due to the current air of anxiety, tension, instability, and violence everywhere in the world; particularly after the events of September in the U.S.A.

We need an Arabic civilization initiative to fight the notion that every Arabic person is a potential terrorist, which is exaggerated, and promoted by Zionism. The image of Arabs in European mass media must be changed, to detach Islam from terrorism and stress its ability to build reasonable and constructive social relations.

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Conclusion

From the above, it is evident that humanity has a great heritage of values, and beliefs that may vary in appearance, but in essence, they all express similar views defending human rights, and dignity, and calling for understanding, and love. Expanding knowledge of these cultures will certainly lessen the tendency to civilizations' conflict and overcome all difficulties that hinder international understanding.

The problem of international understanding is one of inter-cultural relations that must develop in the direction of creating a world society based on mutual understanding and respect. This society must embrace the human tendency for the mutual recognition of common values, under the slogan of *varied cultures, but all accepted*. Since more than a decade , particularly after the dissolution of the Soviet Union, and the end of the Cold War, the world has been witnessing a period of instability, and simultaneously a prevalent call for a new international system as an alternative for the one existed in the Post-World War II period.

We hope that the new system will secure the rights of small nations prior to securing that of the major ones, and not to be based only on the will of the victorious, as was the case in the old one. It is also hoped that the new world system will bring prosperity to all people, not to be dominated by one party, to enhance co-operation, understanding, and co-existence of different civilizations.

While some argue that globalization is the domination of a specific culture, and imposing single concepts on all people, yet in fact, it should be understood as a natural result of fast communications and a movement of give and take. Still, the stronger party will certainly have more contributions in that movement. The Arabic/Islamic world does not fear globalization because it has much to give due to its great civilization. Therefore, it has to introduce the true, correct image of Islam, that managed to release human capacities everywhere, and create a glorious civilization, positively reacting with the other ones, to ultimately become an integral part of current human civilization.

Therefore, the Arab world must never be apprehensive from globalization, or from lacking ability to participate in that system efficiently.

U.S.A – now at the crossroads – must exploit its huge potentialities to constitute the base of world settlement, adopt a rational policy , abandon the call for expanding the circle of war and revenge, and stick to the ideals that suite the single major super-power in today's world. In that sense, its declared determination to change the system in some countries by military force means a complete destruction of a basic principle of the U.N as well as the international laws, which prohibit the interference in other nations' internal affairs. In addition, its biased concept of terrorism and division of the world nations into two axes; one of evil and the other of goodness, will lead the world to a dead end.

We are hoping that the U.S., with its huge military and economic abilities, will embody welfare, justice and rightness. We also wish that it would adhere to the ideals adopted by its early pioneers, who were always figuring U.S.A as carrying the torch of freedom and liberation. U.S.A must be aware that any nation that resort to solve problems by force will eventually recognize that power has its limits, and its outcome is not necessarily, what was expected.

Finally, we repeat that Islam - the religion of more than a billion Muslims who constitute a great power in the world nowadays, and occupy a large part of the globe – is in its reality, and at the core distinguished with tolerance, and acknowledges the multiplicity of cultural, and ethnic principles. We also denounce the allegations that Islam, and terrorism are two sides of one coin, and that Islamic terrorism is the heir of communist danger.

As Arabic civilization is now at a critical historical juncture facing unprecedented challenges, it must present all its experiences and fundamental legacy for humanity to be recognized by others.

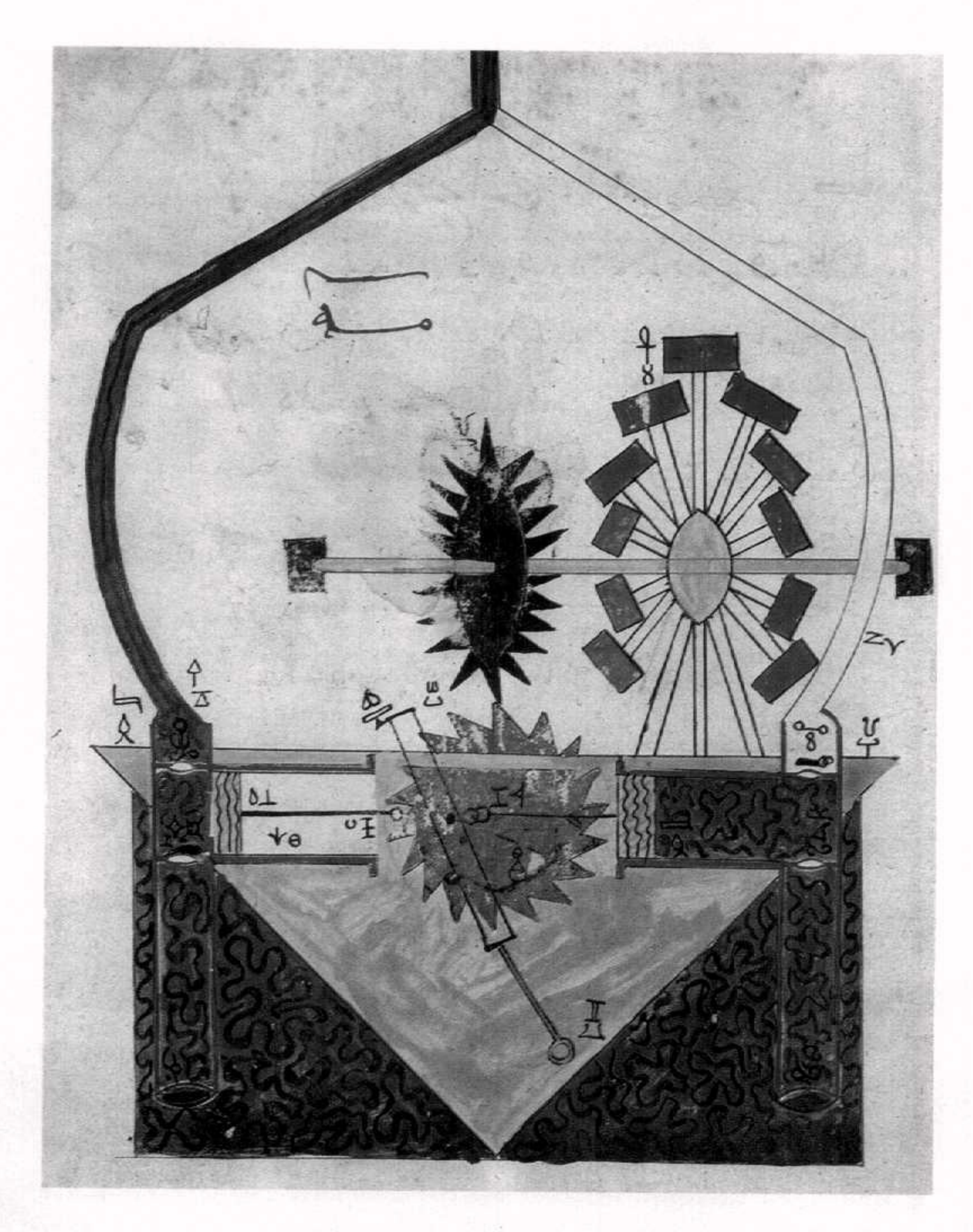
Islamic-Western dialogue must not be limited to our glorious past, but should also include our present ability to contribute to the progress and welfare of humanity.



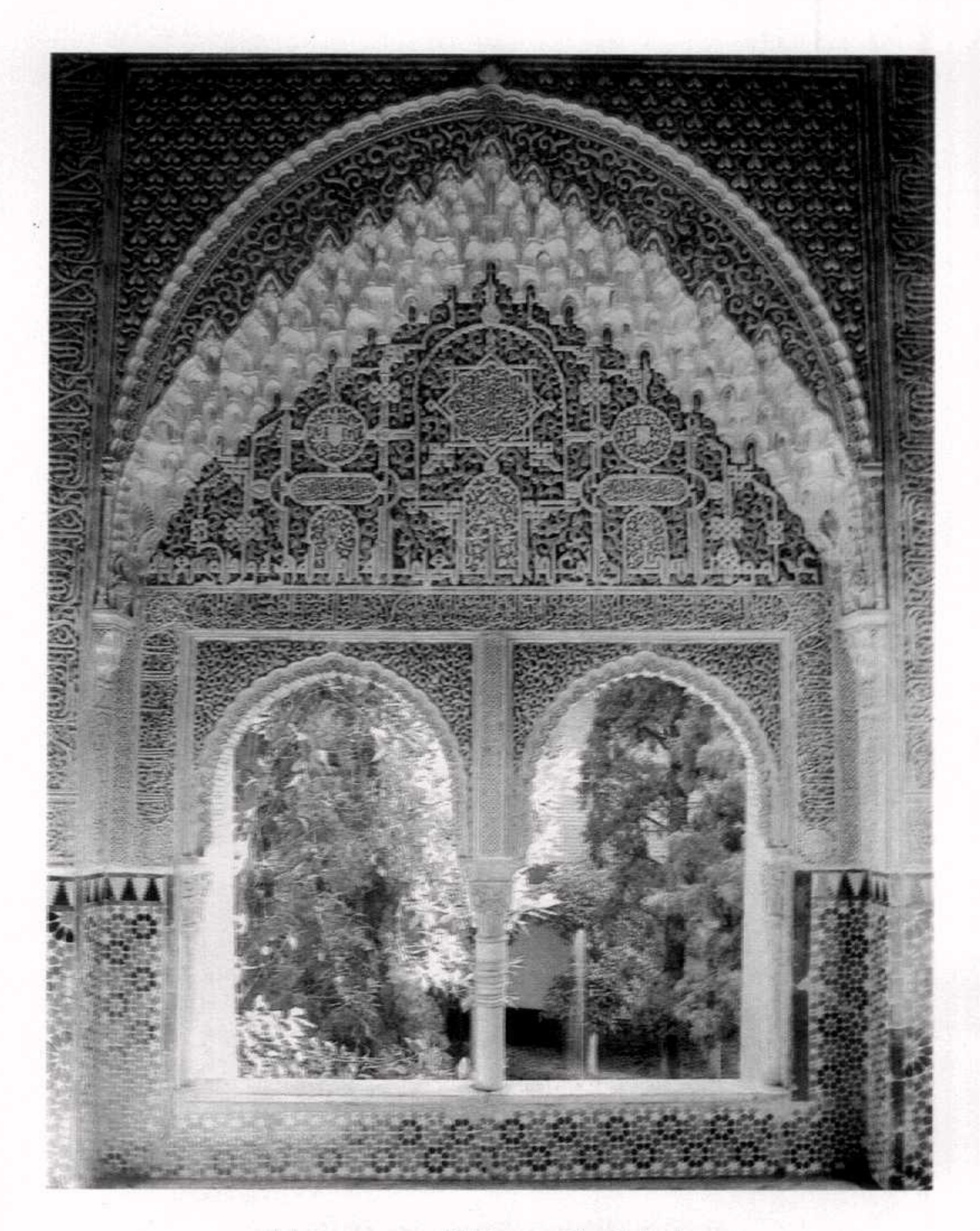
Surgical instruments according to Azzahrawi



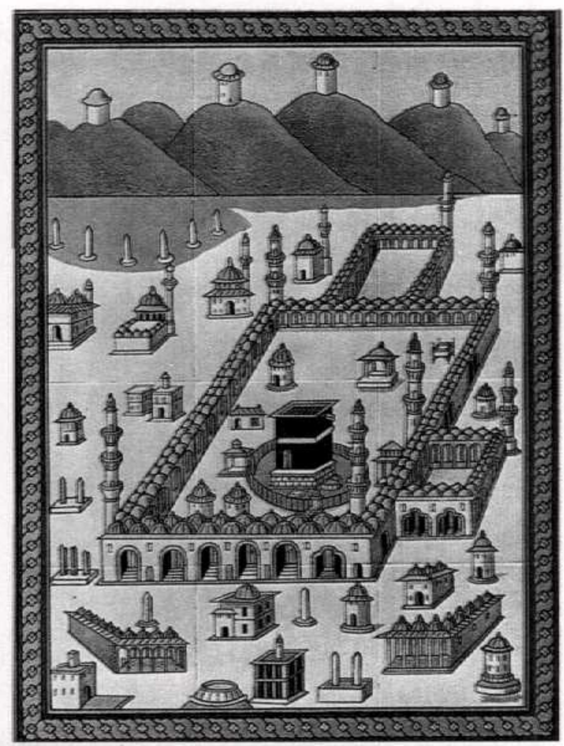
Western Asia painting by Ibn Hawkqal



Reverberating pump by Al - Gazzary



Lions arena , Al-Hamra, Andalusia



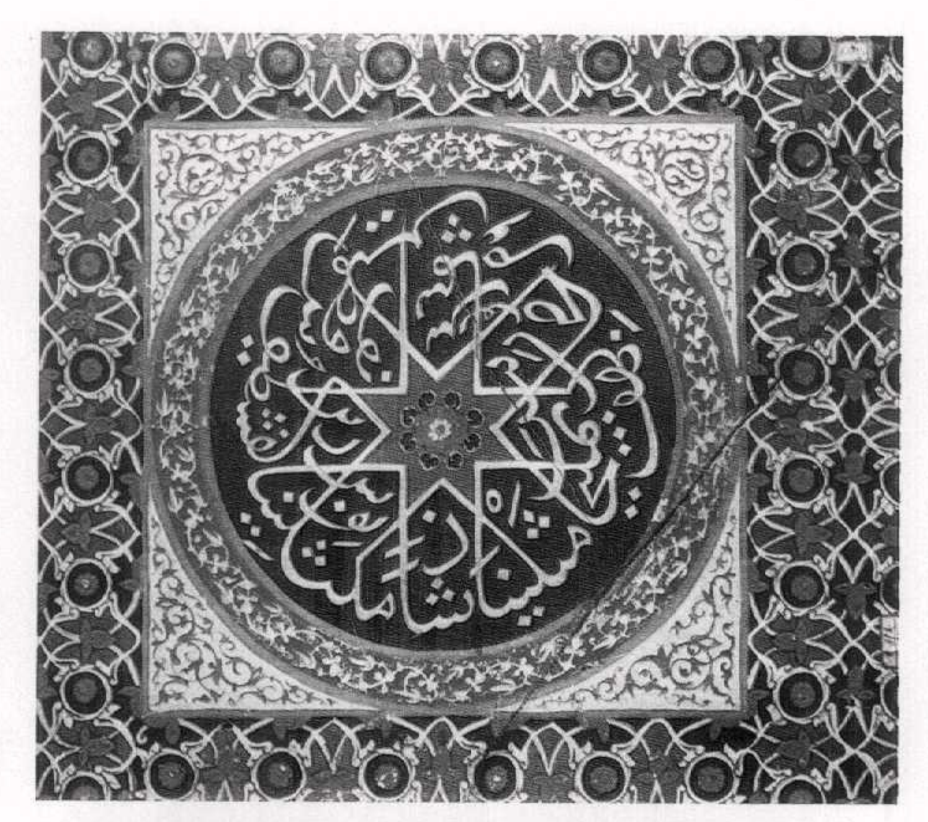
Islamic ornaments (16 th Century)



Tableau from Tunisian Folk Art
shows the Holy verse 'Allah is Almighty'



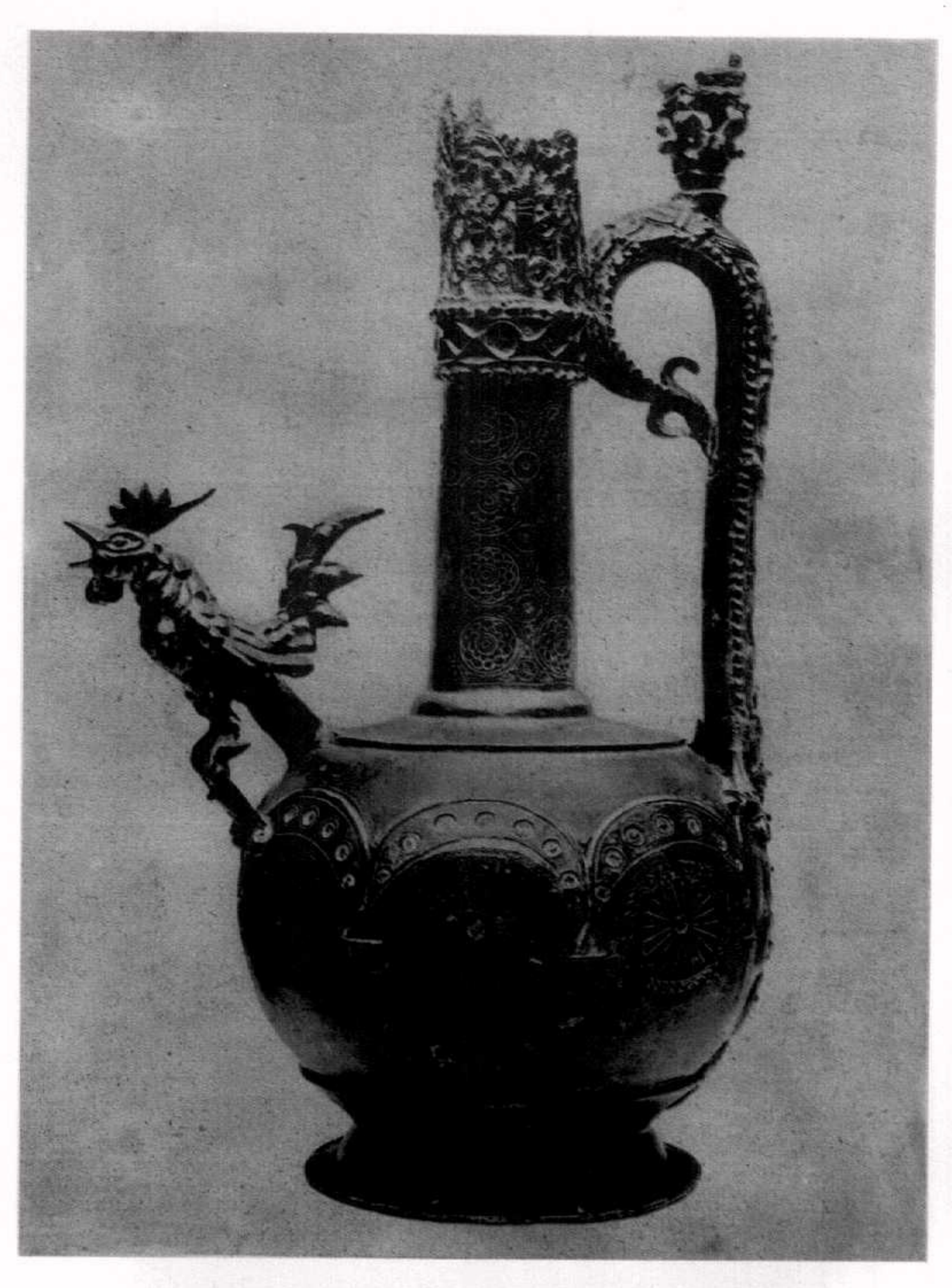
Granada Alhambra:Patio with the tower of Qamarin



Geometrical and ornamental repeatation in Islamic art



An internal title from the manuscript , treasure of secrets



Sasanic style bronze jar from the late Umayyad or early Abbasid era



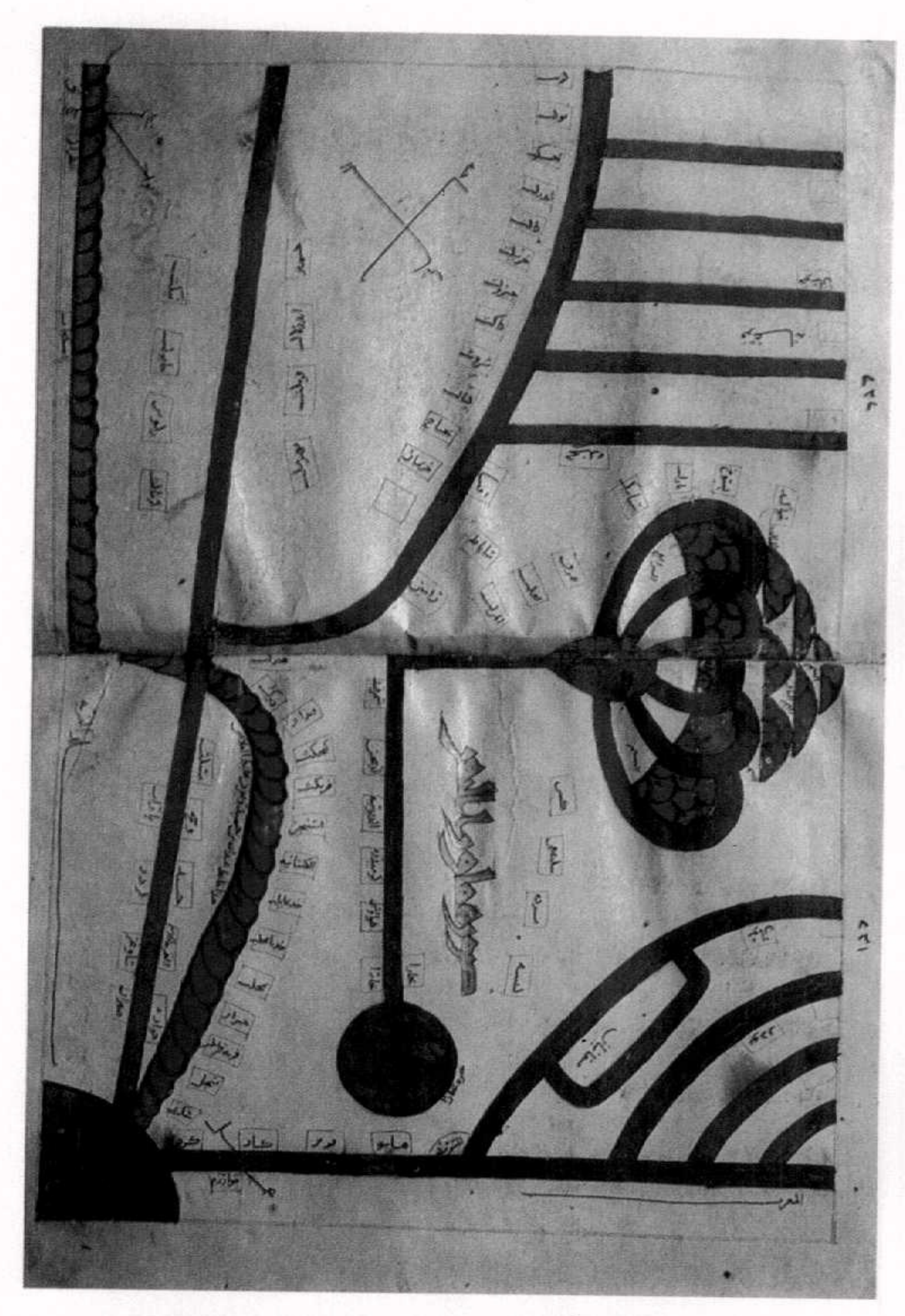
Nezami Khesru and Shireine, Iran, Royal Scotch Museum-Edinburgh



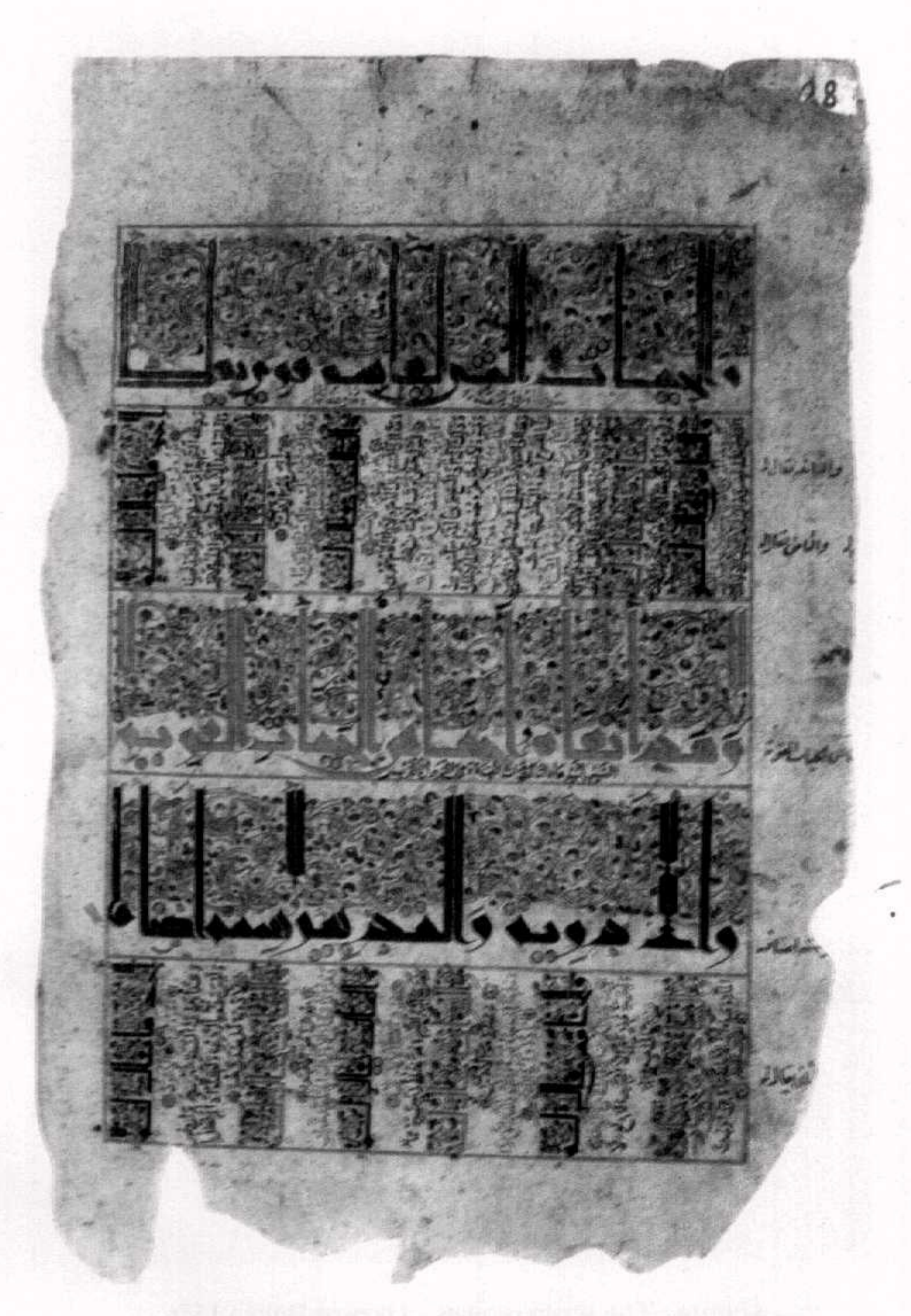
Avicenna



Al-Kendy



Central Asia and beyond the river painting by Ibn -Hawqal



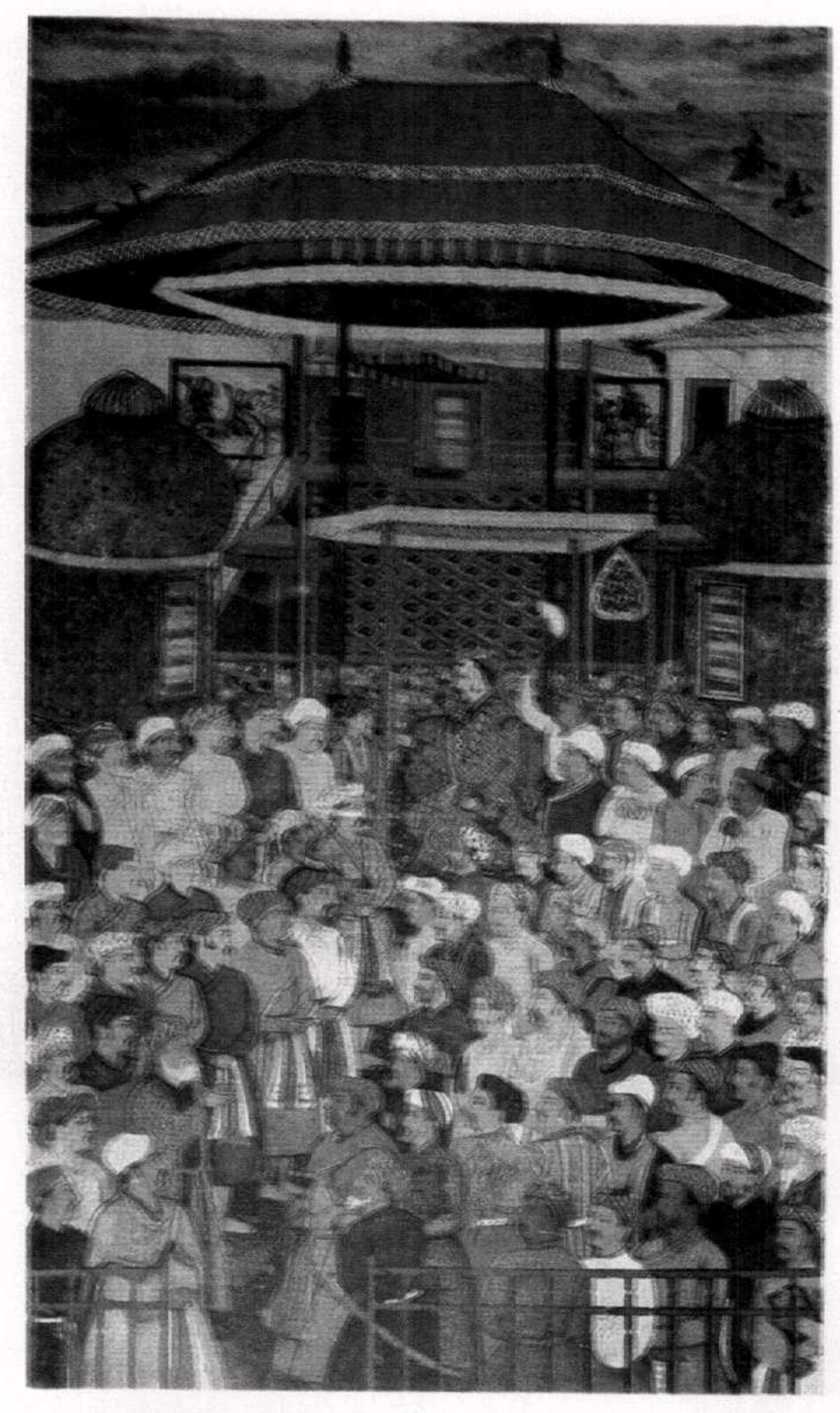
Arts of Arabic Calligraphy



Gambi : The seven crowns - Qazwin Dahra 1556, Friar Museum, Washington D.C.



The seventh music wings



Dar Barma Hunger - India 17 th century (Hermitage museum- Leningrad)



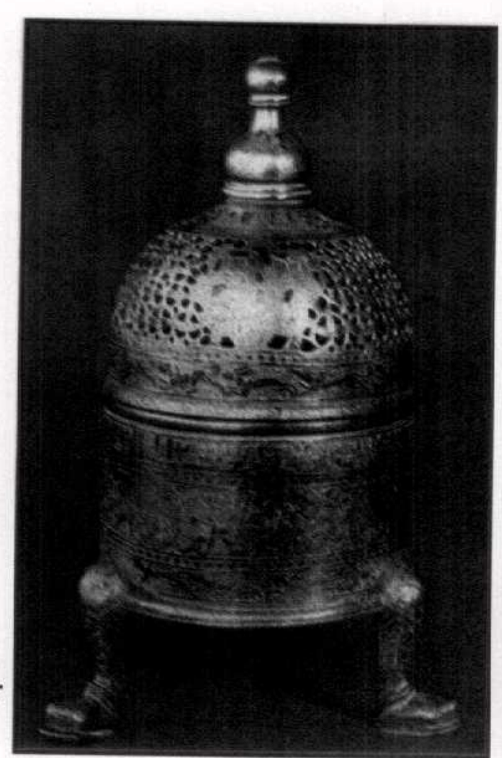
Base of candlestick made of copper ornamented with silver , plants and writings from Iran



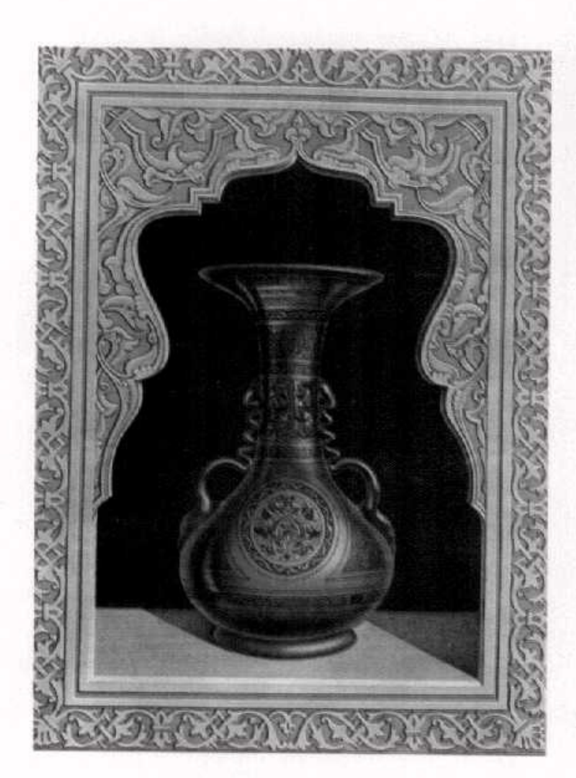
Tin made of coppper ornamented with silver - Egypt - Mamlouk era



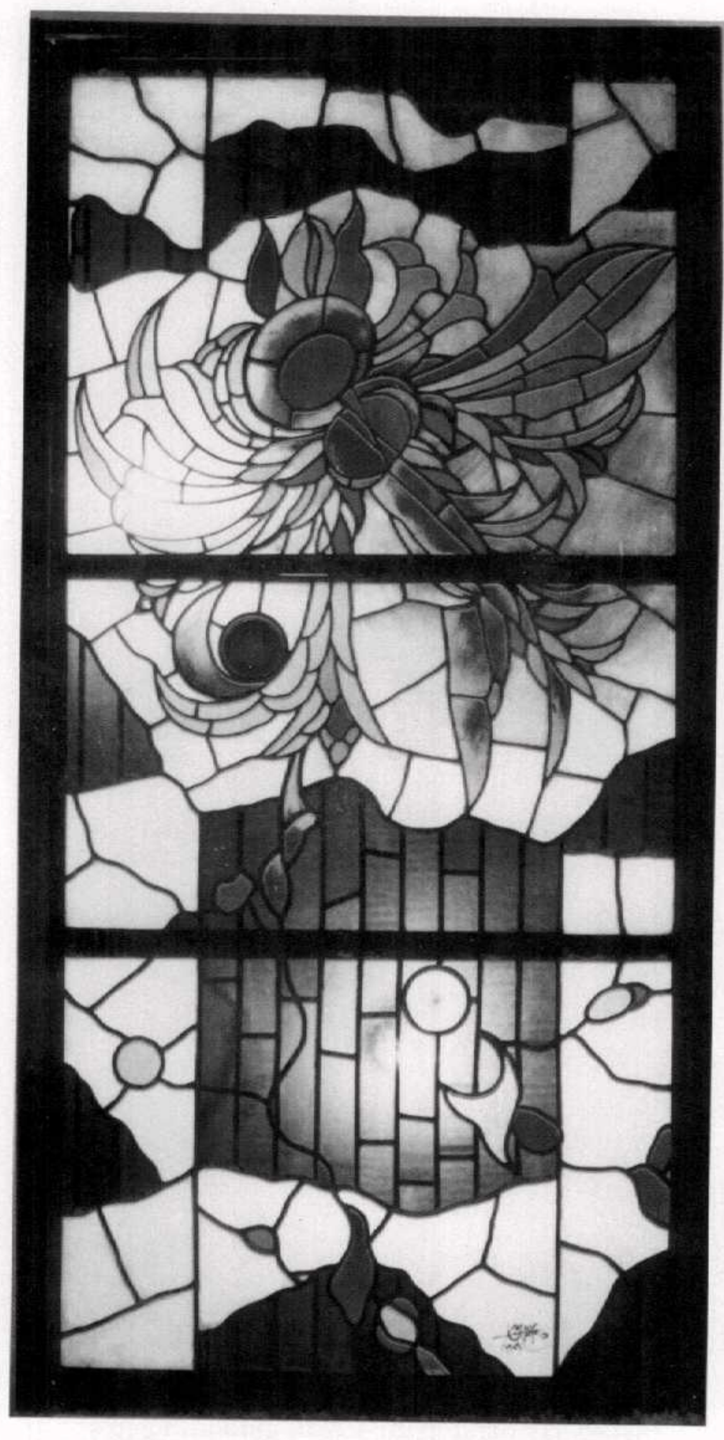
Ornamented metal pots - Egypt - Fatimid era



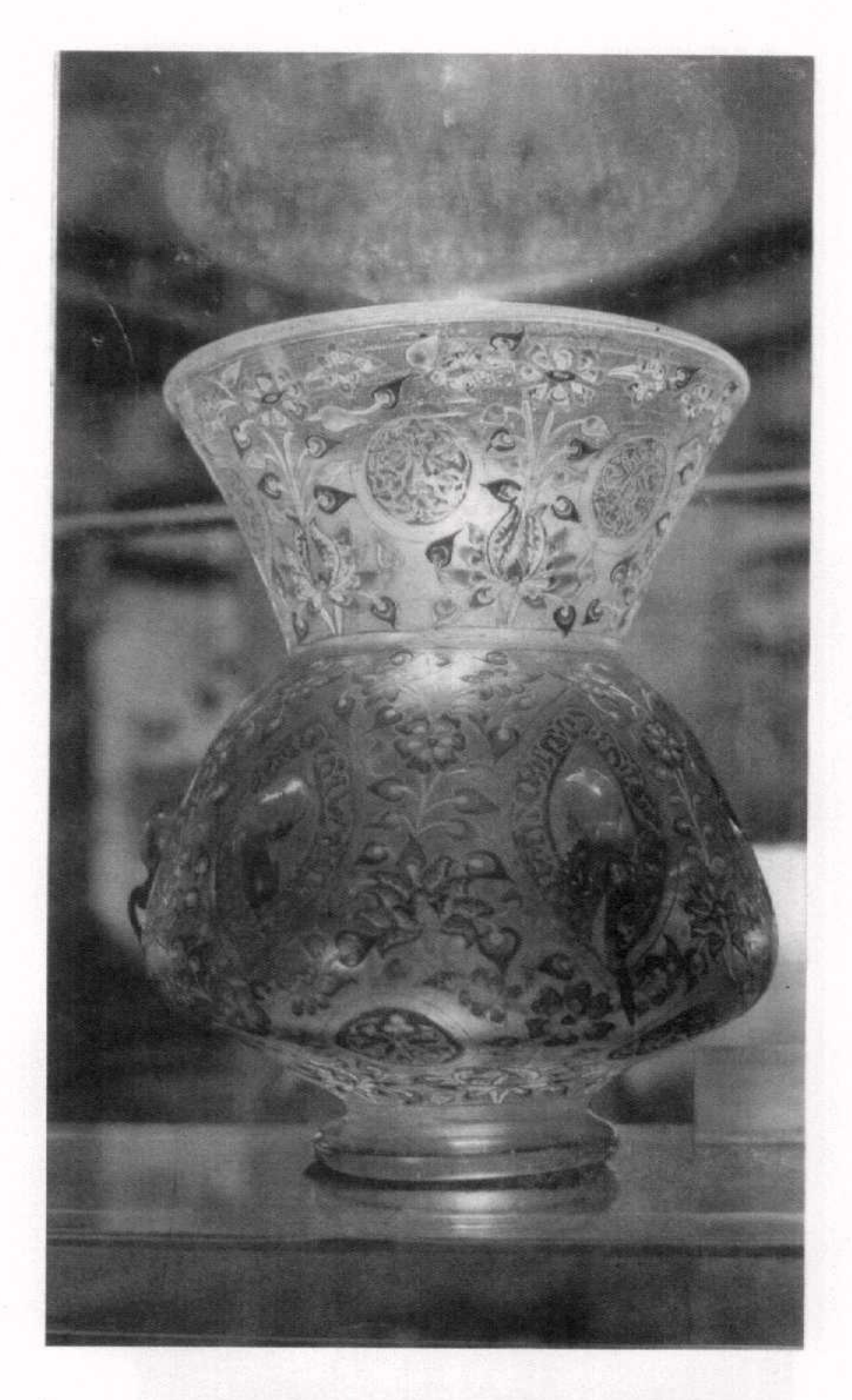
Copper Incense pot ornamented with silver, with the name of Sultan Abu-Bakr engraved on it



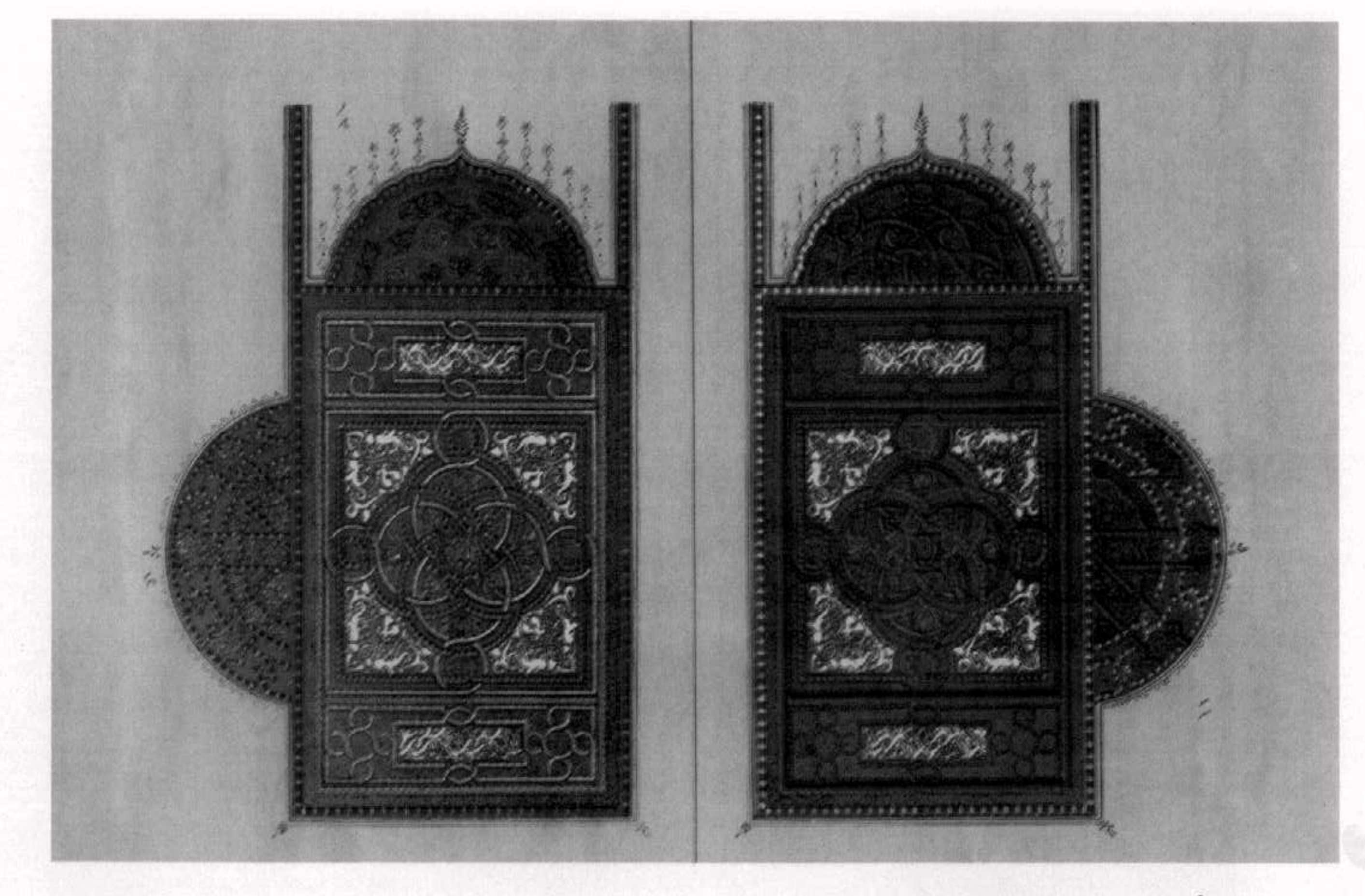
Crystal vase (16 th century)



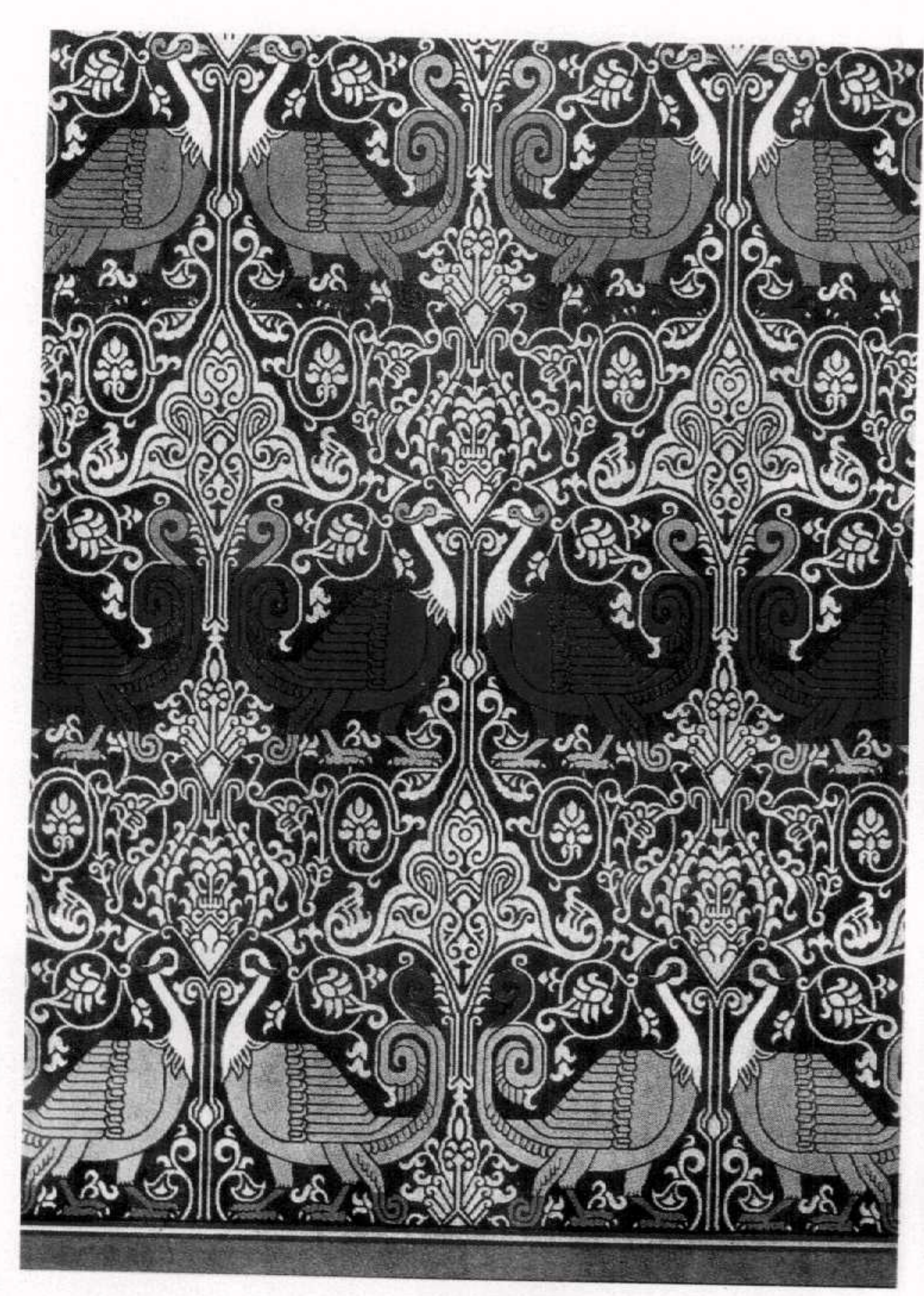
Window from stained and coloured glass



Glass jar ornamented with gold and gems



Pages of the Holy Quran - style from Morocco Mohamed Abul Dahab Mosque - 18 th century



Islamic textile (14^{th} century)



Ibn El-Haytham



Al-Khwarezmy



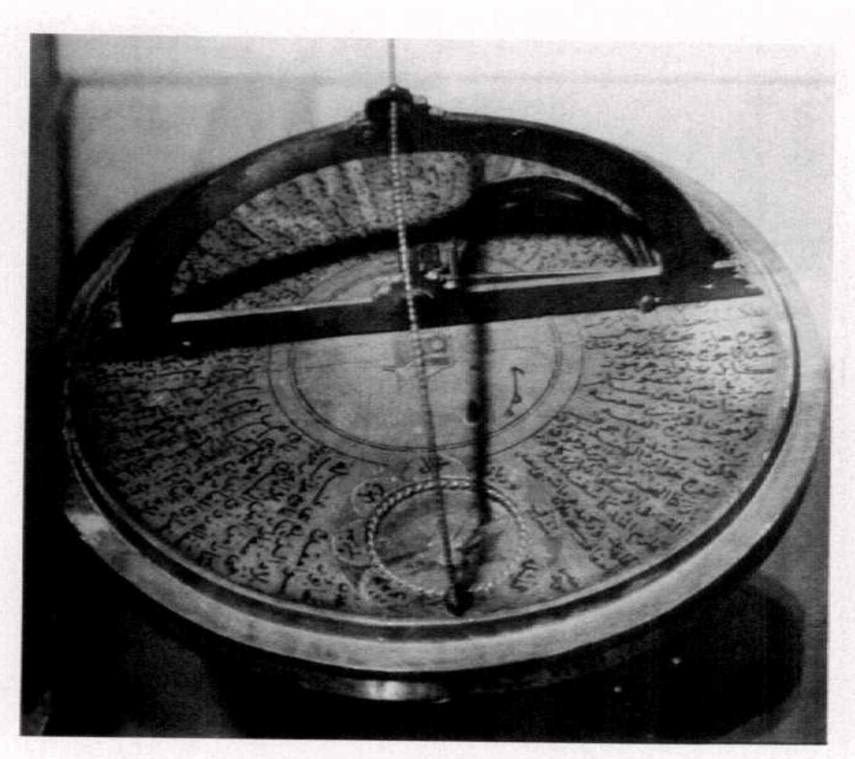
Dome of the rock - Mosaics 681 -692



Al-Ferdawsi, Shahnama, Alexander the Great - Tebriz 1320, Friar Museum, Washington D.C.



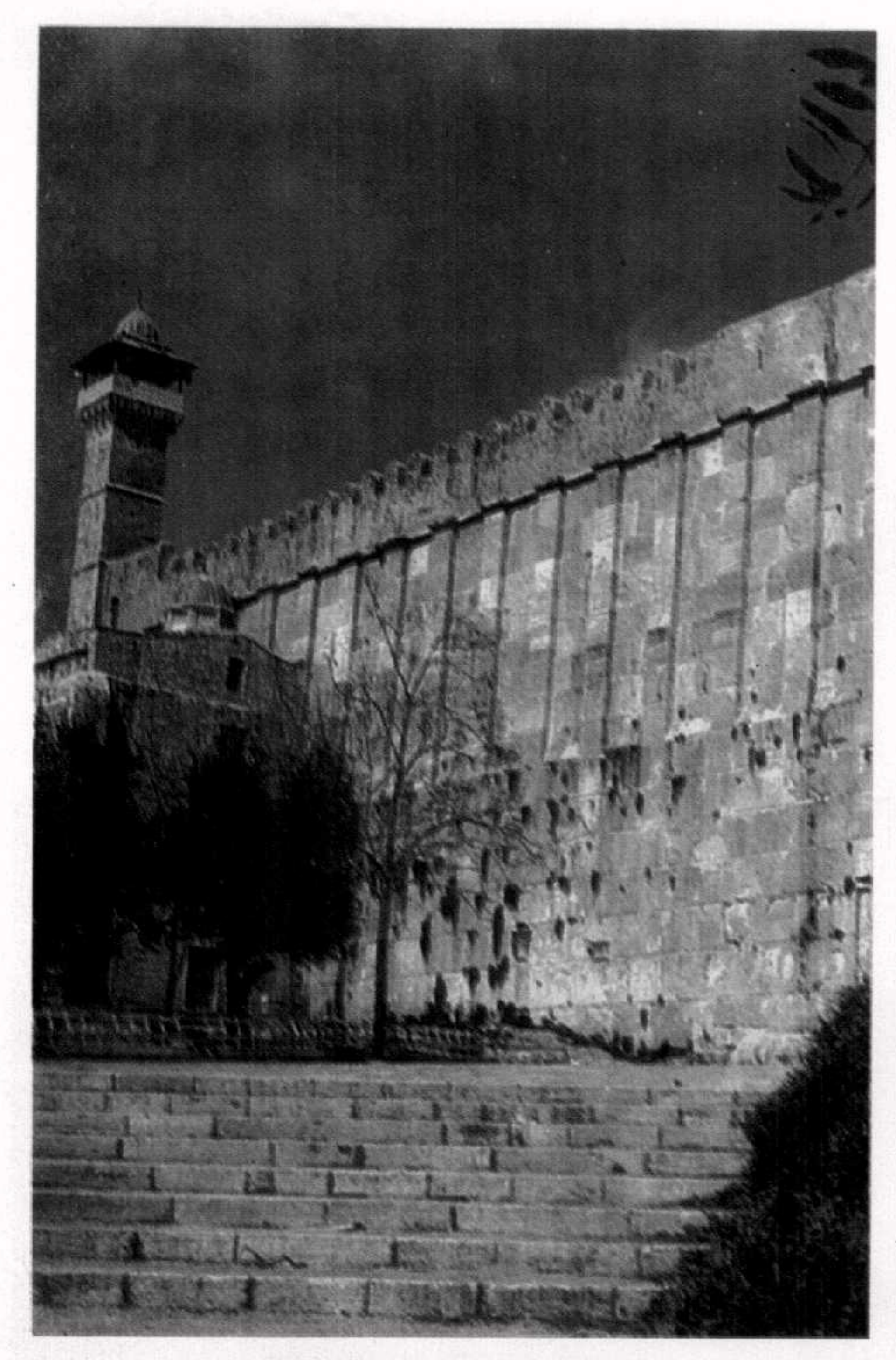
Flat compass from Middle age signed by Ibn El Hussein Ahmad el-Baghdady



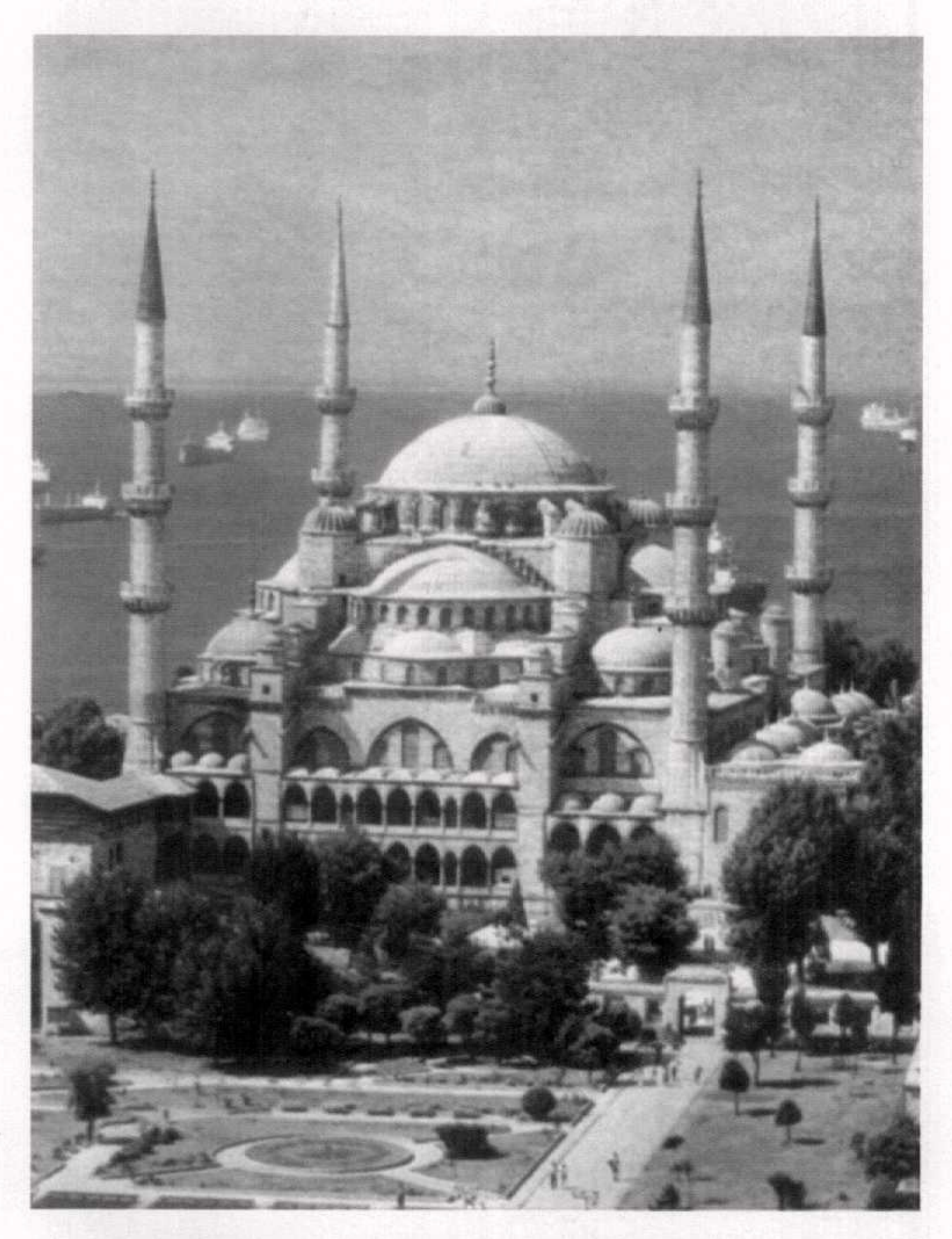
Ottoman compass



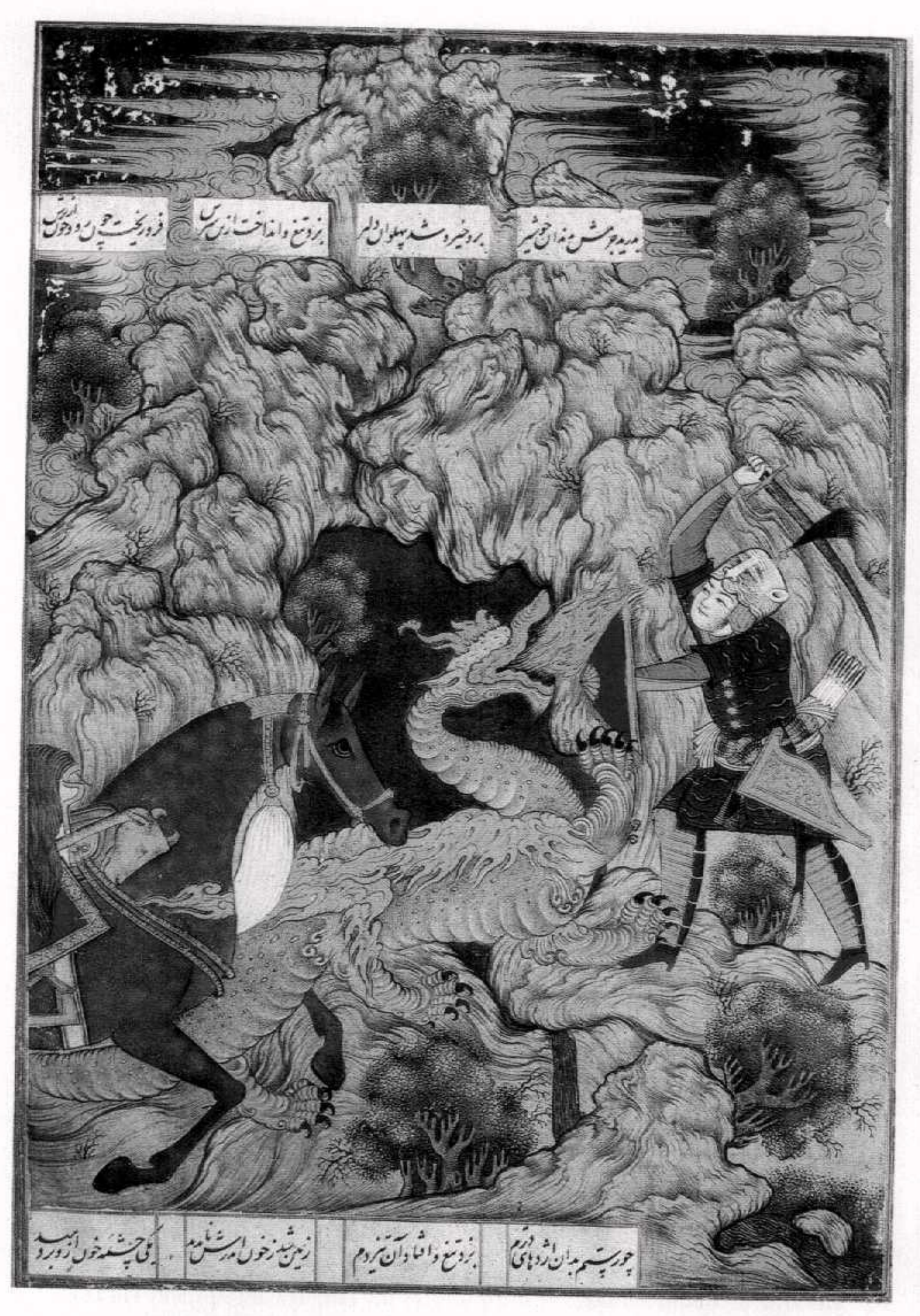
Medications that are still used nowadays



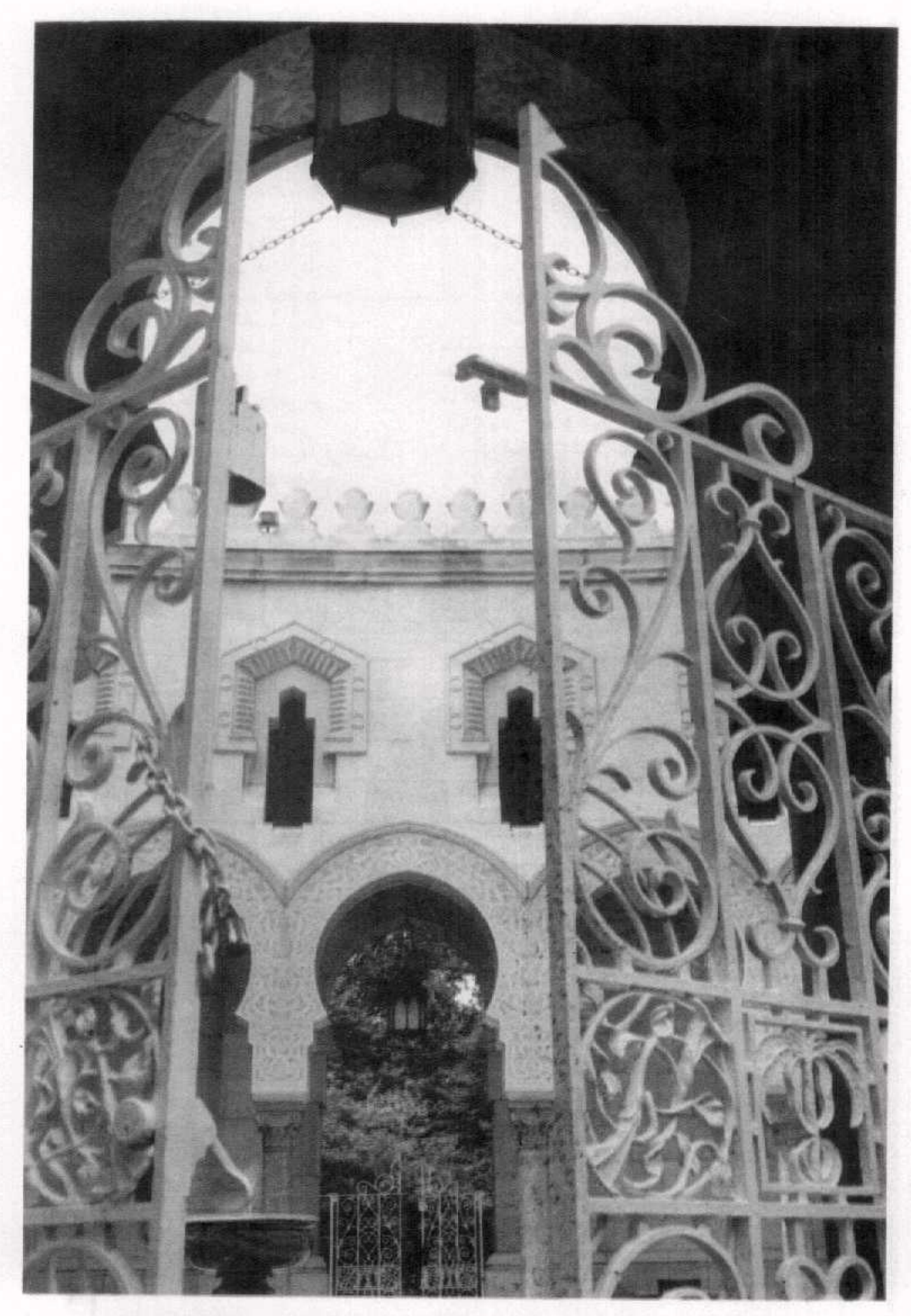
Fence of the Jerusalem Holy shrine



Mosque of Sultan Ahmed the third (one of the famouse mosques in Turkey)

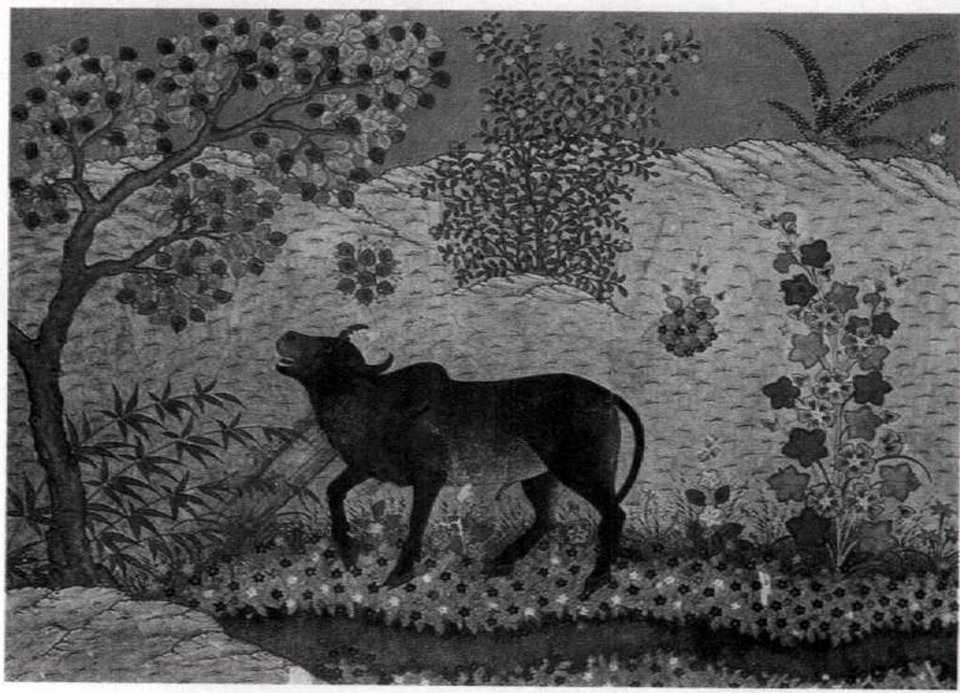


Al- Ferdawsi : the-Shahnama, al-Bustan, Iran - Windsor library



Islamic Center in Washington- Oriental style in the west Capital





Kalila and Demna - Taymouryia School 1410 (Gulistan library- Tehran)



Tel.& Fax: 02 - 4935717
Mob. :010 / 1646345